

## TEST REPORT

ACCORDING TO: FCC CFR 47 part 90 subpart S, part 15 subpart C §15.247(FHSS)  
and subpart B

FOR:

**Motorola Israel Ltd.**

**Car phone**

**Product name: Spirit iDEN**

**Trade name: M710**

**Model: F321501GNAA**

**FCC ID:AZ492FT5854**

**IC:109U-92 FT5854**

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## 1 Applicant information

**Client name:** Motorola Israel Ltd.  
**Address:** 3 Kremenetski street, P.O.B. 25016, 67899 Tel Aviv, Israel  
**Telephone:** +972 3565 8888  
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**Contact name:** Mr. Alex Babaladze, Mr. Avner Chen

## 2 Equipment under test attributes

**Product name:** Car phone  
**Product name:** Spirit iDEN  
**Trade name:** M710  
**EUT model:** FLN3643A, S/N 089SGiJ0053;  
FLN3733A, S/N 791SHG0017  
**Kit (including the EUT) model:** F321501GNAA  
**Receipt date** 7/02/2006

## 3 Manufacturer information

**Manufacturer name:** Motorola Israel Ltd.  
**Address:** 3 Kremenetski street, P.O.B. 25016, 67899 Tel Aviv, Israel  
**Telephone:** +972 3565 8888  
**Fax:** +972 3565 8888  
**E-Mail:** alexb@motorola.com, avner.chen@motorola.com  
**Contact name:** Mr. Alex Babaladze, Mr. Avner Chen

## 4 Test details

**Project ID:** 17112  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test performed:** From 7/02/2006 to 7/05/2006;  
from 10/1/2007 to 10/17/2007  
**Test specification(s):** 47CFR part 90, subpart S;  
part 15 subpart C, §15.247 and subpart B

## 5 Tests summary

Test	Status
<b>Transmitter characteristics according to part 90</b>	
Section 90.635, RF output power	Pass
Section 90.209, 90.691 Occupied bandwidth	Pass
Section 90.691, Emission mask	Pass
Section 90.691, Radiated spurious emissions	Pass
Section 90.691, Conducted spurious emissions	Pass
Section 90.213, Frequency stability	Pass
Section 2.1091, RF radiation exposure evaluation	Not required
<b>Transmitter characteristics according to part 15 section 15.247 (FHSS)</b>	
Section 15.247(a)1, (g), (h), Frequency hopping requirements	Pass
Section 15.247(a)1, 20 dB bandwidth	Pass
Section 15.247(a)1, Frequency separation	Pass
Section 15.247(a)1, Number of hopping frequencies	Pass
Section 15.247(a)1, Average time of occupancy	Pass
Section 15.247(b), Peak output power	Pass
Section 15.247(b)5, RF exposure	Pass, refer to exhibit
Section 15.247(c), Emissions at band edges	Pass
Section 15.247(c), Radiated spurious emissions	Pass
Section 15.207(a), Conducted emission	Not required
<b>Unintentional emissions</b>	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass
Section 15.111, Conducted emission at receiver antenna port	Not required

The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

This test report replaces the previously issued test report identified by Doc ID:MOTRAD\_FCC.17112. The previously approved by FCC product (FCC ID:AZ492FT5854) was updated for the additional band 902.0 - 928.0 MHz.

	Name and Title	Date	Signature
<b>Tested by:</b>	Mr. A. Lane, test engineer	July 5, 2006	
	Mr. S. Samokha, test engineer	October 17, 2007	
<b>Reviewed by:</b>	Mrs. M. Cherniavsky, certification engineer	October 18, 2007	
<b>Approved by:</b>	Mr. M. Nikishin, EMC and Radio group leader	October 19, 2007	



## 6 EUT description

### 6.1 General information

The EUT, Spirit iDEN, trade name M710, is a car phone. The kit number F321501GNAA (including the EUT), supplied to the customer, is described in Table 6.3 below.

### 6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length
		From	To				
Power & signal	DC+signal	EUT	Octobus cable	Terminal block	1	Octobus cable, non-detachable	

### 6.3 Support and test equipment

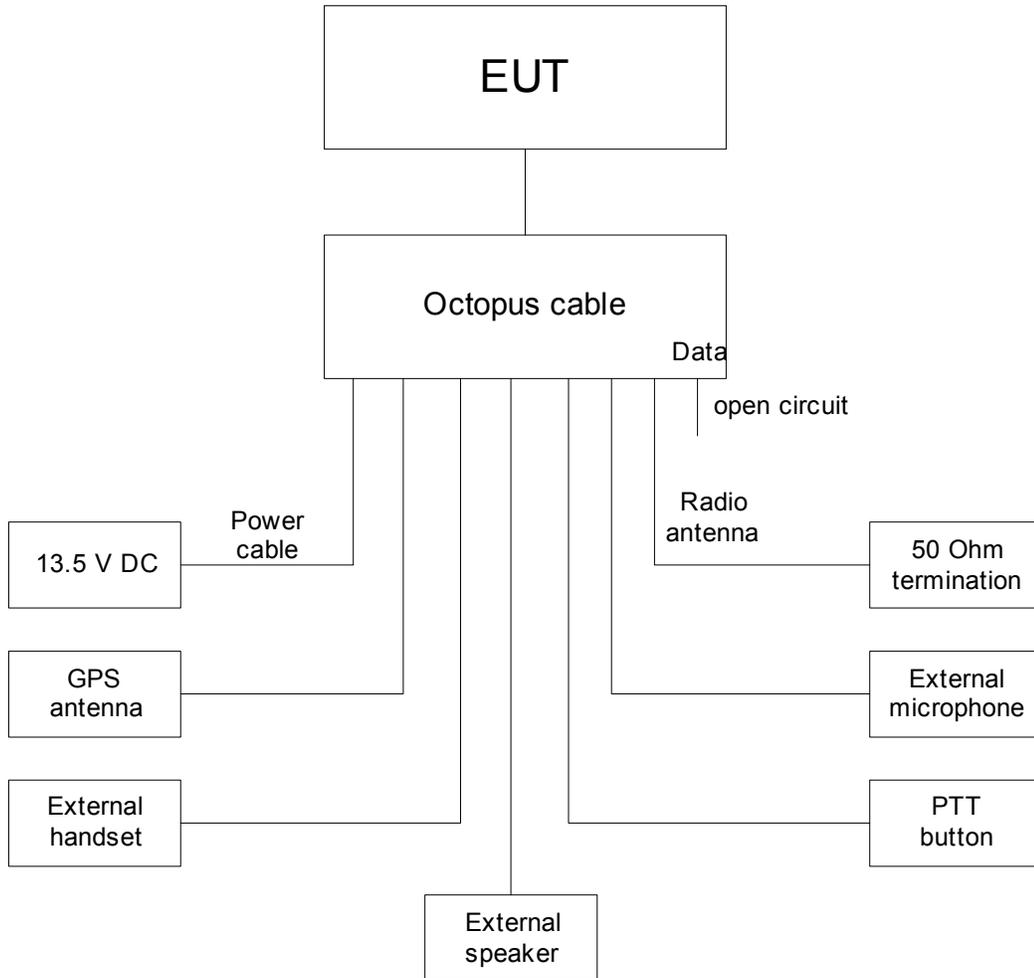
Description	Manufacturer	Model number	Serial number
External microphone	Motorola	FTN6949A	NA
External speaker	Motorola	FTN7136A	205012206
External handset +cradle	Motorola	NA	NA
PTT button	Motorola	FLN9299B	0206B
Antenna GPS	Motorola	A84725	NA
Power cable	Motorola	FKN8408A	NA

### 6.4 Changes made in the EUT

No changes were implemented.



### 6.5 Test configuration





### 6.6 Transmitter characteristics of iDEN Tx

<b>Type of equipment</b>						
V	Stand-alone (Equipment with or without its own control provisions)					
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)					
	Plug-in card (Equipment intended for a variety of host systems)					
<b>Intended use</b>		<b>Condition of use</b>				
	fixed	Always at a distance more than 2 m from all people				
V	mobile	Always at a distance more than 20 cm from all people				
	portable	May operate at a distance closer than 20 cm to human body				
<b>Assigned frequency range</b>		806-825 / 896 – 901 MHz				
<b>Operating frequency range</b>		806.01-824.98 / 896.01 – 900.98 MHz				
<b>RF channel spacing</b>		12.5 kHz				
<b>Maximum rated output power</b>		At transmitter 50 Ω RF output connector		26.9 dBm/26.3 dBm		
		Effective radiated power (for equipment with no RF connector)		dBm		
<b>Is transmitter output power variable?</b>		No				
		V	Yes	continuous variable		
				V	stepped variable with stepsize	5 dB
				minimum RF power		22 dBm
maximum RF power		26.9 dBm/26.3 dBm				
<b>Antenna connection</b>						
unique coupling	V	standard connector	integral	with temporary RF connector without temporary RF connector		
<b>Antenna/s technical characteristics</b>						
Type	Manufacturer	Model number	Gain			
Dual band 800/900	NA	NA	For reference only: +5 dBi - iDEN			
<b>Transmitter 99% power bandwidth</b>		18.3 kHz, 43.3 kHz, 68.3 kHz, 93.3 kHz (refer to Annex 1 of this test report)				
<b>Type of modulation</b>		QPSK, 16QAM, 64QAM				
<b>Type of multiplexing</b>		TDMA				
<b>Modulating test signal (baseband)</b>		iDEN				
<b>Maximum transmitter duty cycle in normal use</b>		67%	<b>Tx ON time</b>	60 msec	<b>Period</b>	90 msec
<b>Transmitter duty cycle supplied for test</b>		33.33%	<b>Tx ON time</b>	30 msec	<b>Period</b>	90 msec
<b>Emission designator:</b> 18K3D7W, 43K3D7D, 68K3D7D, 93K3D7D (refer to attached Modulation Characteristics)						
<b>Transmitter power source</b>						
	Battery	<b>Nominal rated voltage</b>	VDC	<b>Battery type</b>		
V	DC	<b>Nominal rated voltage</b>	12 VDC			
	AC mains	<b>Nominal rated voltage</b>	VAC	<b>Frequency</b>	Hz	



### 6.7 Transmitter characteristics of FHSS MOTotalk Tx

<b>Type of equipment</b>						
<b>V</b>	Stand-alone (Equipment with or without its own control provisions)					
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)					
	Plug-in card (Equipment intended for a variety of host systems)					
<b>Intended use</b>		<b>Condition of use</b>				
	fixed	Always at a distance more than 2 m from all people				
<b>V</b>	mobile	Always at a distance more than 20 cm from all people				
	portable	May operate at a distance closer than 20 cm to human body				
<b>Assigned frequency range</b>		902 – 928 MHz				
<b>Operating frequency range</b>		902.525 – 927.475 MHz				
<b>RF channel spacing</b>		50 kHz				
<b>Maximum rated output power</b>		At transmitter 50 Ω RF output connector		25.1 dBm		
		Effective radiated power (for equipment with no RF connector)		dBm		
<b>Is transmitter output power variable?</b>		<b>V</b>	No			
			Yes	continuous variable		
				stepped variable with stepsize		
				minimum RF power		
		maximum RF power			25.1 dBm	
<b>Antenna connection</b>						
unique coupling	<b>V</b>	standard connector-MINI UHF	integral	with temporary RF connector without temporary RF connector		
<b>Antenna/s technical characteristics</b>						
Type	Manufacturer		Model number		Gain	
Dual band 800/900	NA		NA		For reference only: +5 dBi	
<b>Type of modulation</b>		8FSK				
<b>Type of multiplexing</b>		TDMA				
<b>Modulating test signal (baseband)</b>		PRBS				
<b>Maximum transmitter duty cycle in normal use</b>		95%				
<b>Transmitter power source</b>						
	Battery	<b>Nominal rated voltage</b>	VDC	Battery type		
<b>V</b>	DC	<b>Nominal rated voltage</b>	12 VDC			
	AC mains	<b>Nominal rated voltage</b>	VAC	Frequency	Hz	



<b>Test specification:</b>	<b>Section 90.635(d), Maximum output power</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/11/2006 9:49 AM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 7 Transmitter tests according to 47CFR part 90 requirements

### 7.1 RF output power test

#### 7.1.1 General

This test was performed to measure the peak output power at RF antenna connector. Specification test limits are given in Table 7.1.1. The test results are provided in Table 7.1.2 and the associated plots.

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum peak output power	
	W	dBm
806-825/896-901	100	50.0

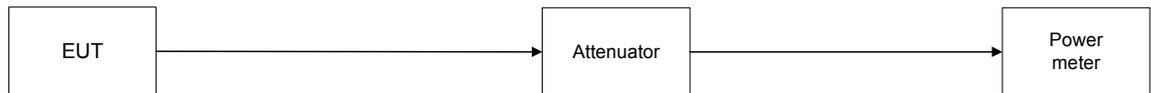
#### 7.1.2 Test procedure

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

7.1.2.2 The EUT was adjusted to produce maximum available to the end user RF output power.

7.1.2.3 The peak output power was measured with a power meter as provided in Table 7.1.2 and associated plots.

Figure 7.1.1 Peak output power test setup





<b>Test specification:</b>	<b>Section 90.635(d), Maximum output power</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	7/11/2006 9:49 AM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 7.1.2 Average output power test results

OPERATING FREQUENCY RANGE: 806-825/896-901 MHz  
DETECTOR USED: POWER METER  
RESOLUTION BANDWIDTH: NA  
VIDEO BANDWIDTH: NA  
MODULATION: 16QAM  
MODULATING SIGNAL: iden  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Carrier frequency, MHz	Power meter reading, dBm	External attenuation, dB	Average factor dB *	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
806.01250	17.46	included	7.71	25.17	50	-24.83	Pass
813.51250	17.43	included	7.71	25.14	50	-24.86	Pass
824.98750	17.36	included	7.71	25.07	50	-24.93	Pass
896.01875	17.21	included	7.76	24.97	50	-25.03	Pass
898.51875	17.18	included	7.76	24.94	50	-25.06	Pass
900.98125	17.16	included	7.76	24.92	50	-25.08	Pass

Reference numbers of test equipment used

HL 2875	HL 2909						
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Full description is given in Appendix A.

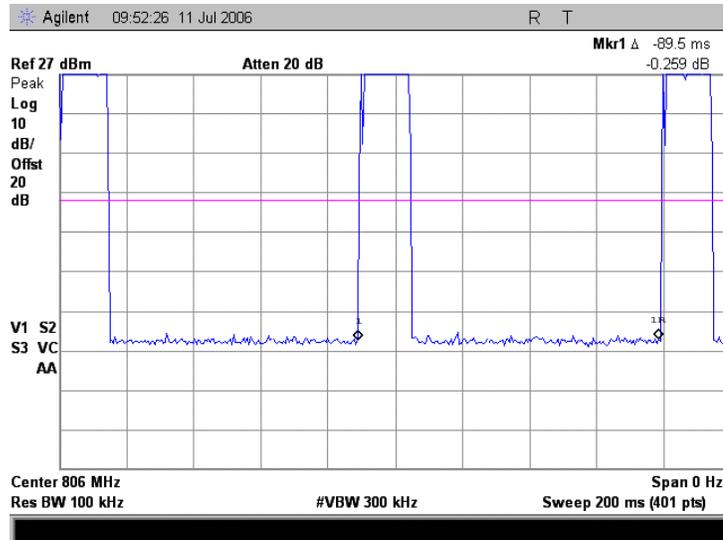
Average factor was added to power meter reading to compensate for the TDM transmission.

\*average factor=10\*log (pulse width/pulse period)

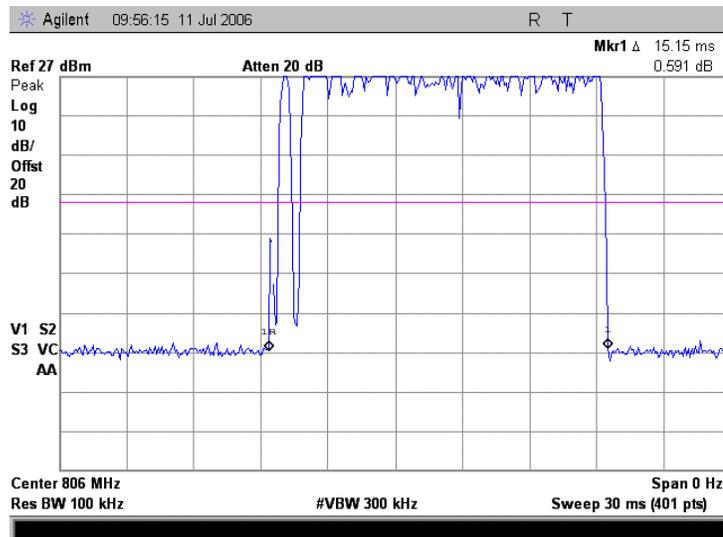


<b>Test specification:</b>	<b>Section 90.635(d), Maximum output power</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/11/2006 9:49 AM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.1.1 TDM period at iDEN 800



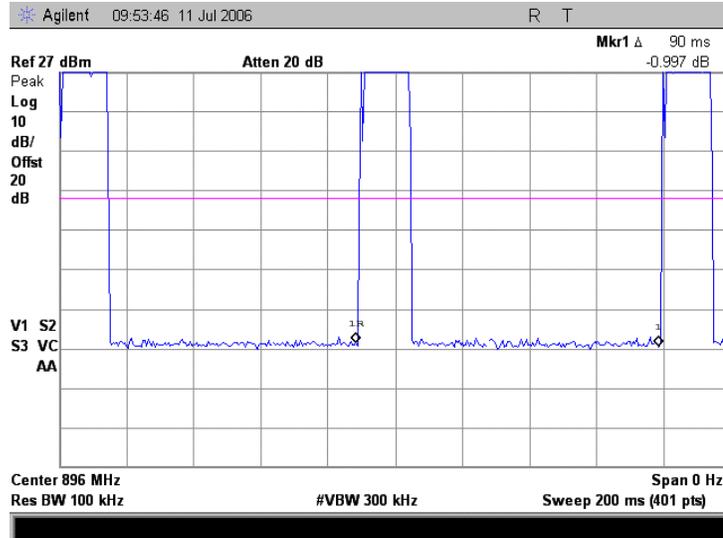
Plot 7.1.2 TDM pulse width at iDEN 800



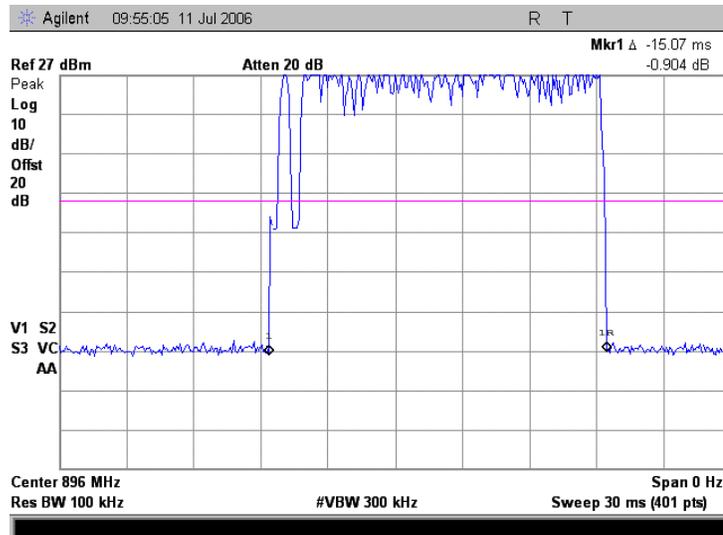


<b>Test specification:</b>	<b>Section 90.635(d), Maximum output power</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/11/2006 9:49 AM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.1.3 TDM period at iDEN 900



Plot 7.1.4 TDM pulse width at iDEN 900





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<b>Test specification:</b>		<b>Sections 90.209, 90.691, Occupied bandwidth</b>	
<b>Test procedure:</b>		47 CFR, Section 2.1049	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 7.2 Occupied bandwidth test

### 7.2.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.2.1. The test results are provided in Table 7.2.2 and the associated plots.

**Table 7.2.1 Occupied bandwidth limits**

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, kHz
806-825/896-901	26	20/25**

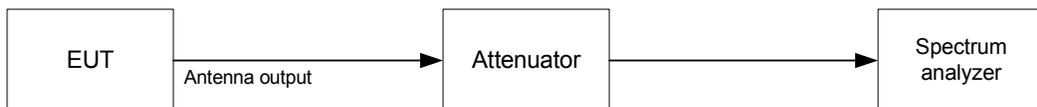
\* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

\*\* - Note: Refer to Annex 1 of this test report.

### 7.2.2 Test procedure

- 7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.
- 7.2.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
- 7.2.2.3 The EUT was set to transmit the normally modulated carrier.
- 7.2.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.2.2 and the associated plots.

**Figure 7.2.1 Occupied bandwidth test setup**





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<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 7.2.2 Occupied bandwidth test results**

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 1 MHz  
 VIDEO BANDWIDTH: 3 MHz  
 MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
 MODULATION: 16QAM  
 MODULATING SIGNAL: iDEN

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
806.01250	17.95	20	-2.05	Pass
813.51250	17.85	20	-2.15	Pass
824.98750	17.95	20	-2.05	Pass
896.01875	Refer to Annex 1, Annex 2 of this test report			
898.51875				
900.98125				

**Reference numbers of test equipment used**

HL 2909	HL 2634						
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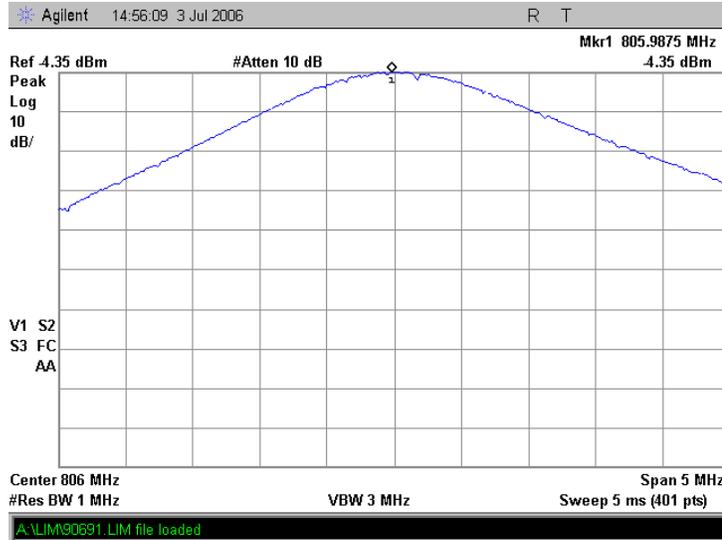
Full description is given in Appendix A.



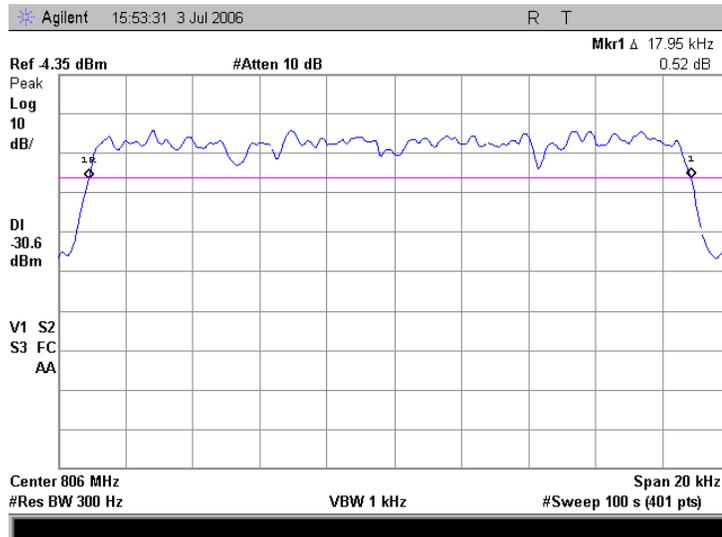
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<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.2.1 Reference peak power level at low frequency, iDEN 800



Plot 7.2.2 Occupied bandwidth test result at low frequency, iDEN 800

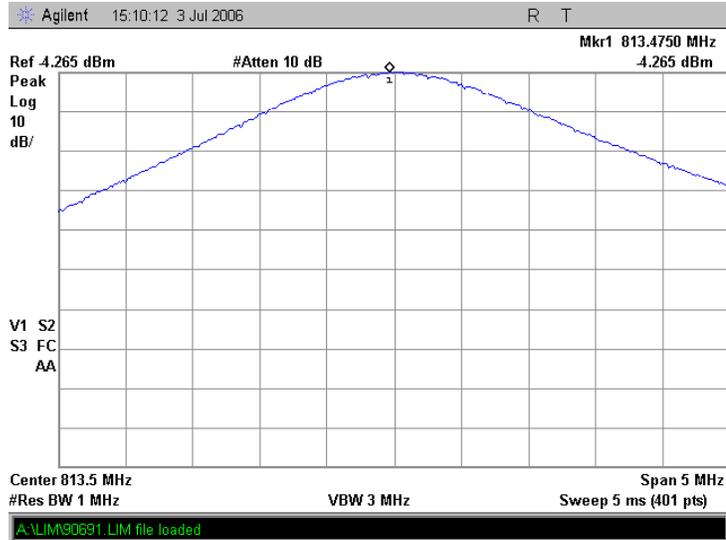




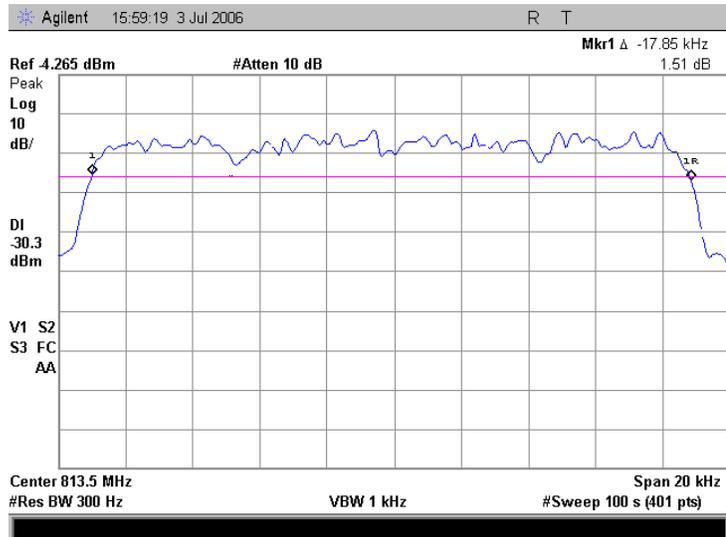
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<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.2.3 Reference peak power level at mid frequency, iDEN 800



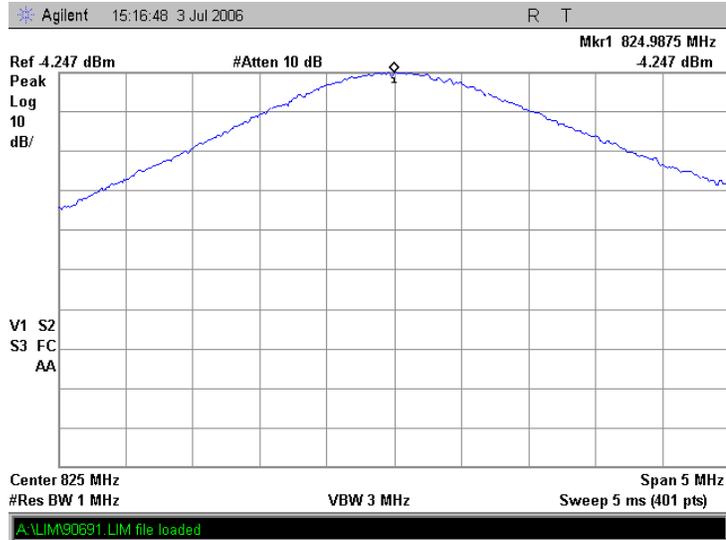
Plot 7.2.4 Occupied bandwidth test result at mid frequency, iDEN 800



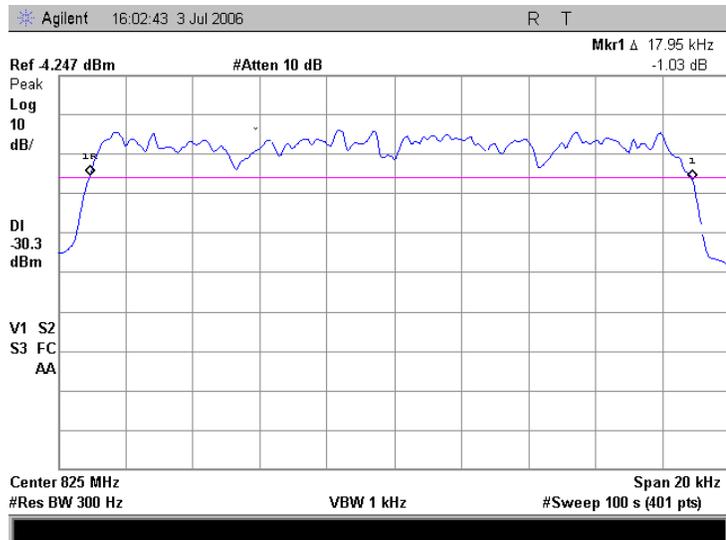


<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.2.5 Reference peak power level at high frequency, iDEN 800



Plot 7.2.6 Occupied bandwidth test result at high frequency, iDEN 800

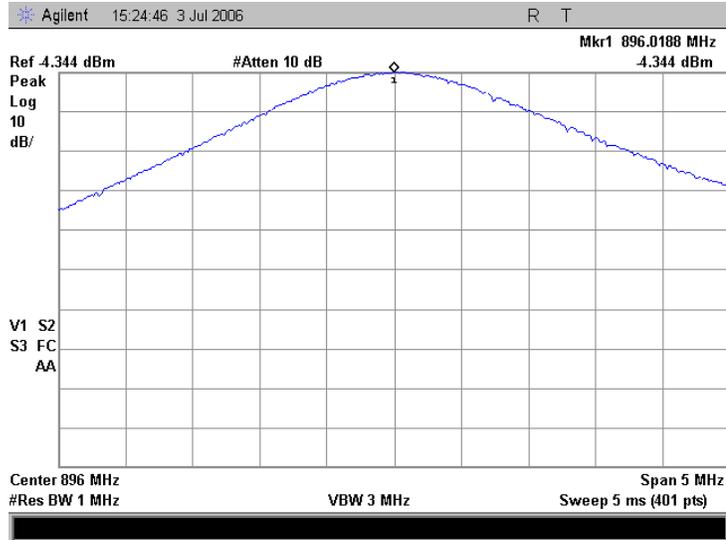




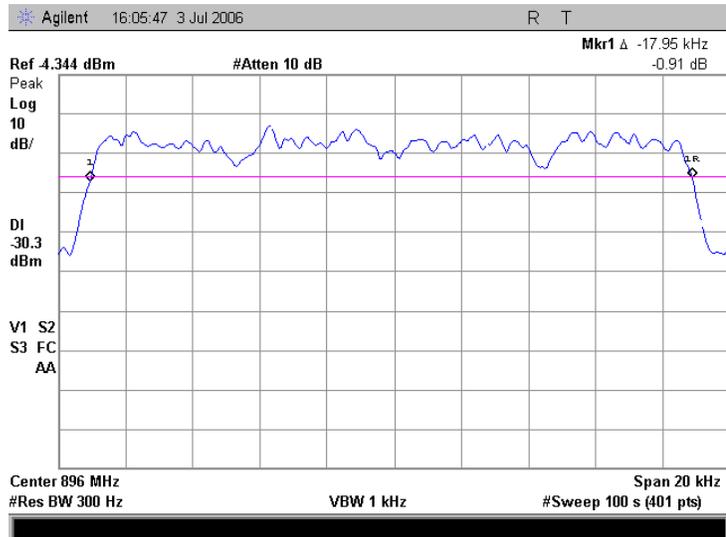
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<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.2.7 Reference peak power level at low frequency, iDEN 900



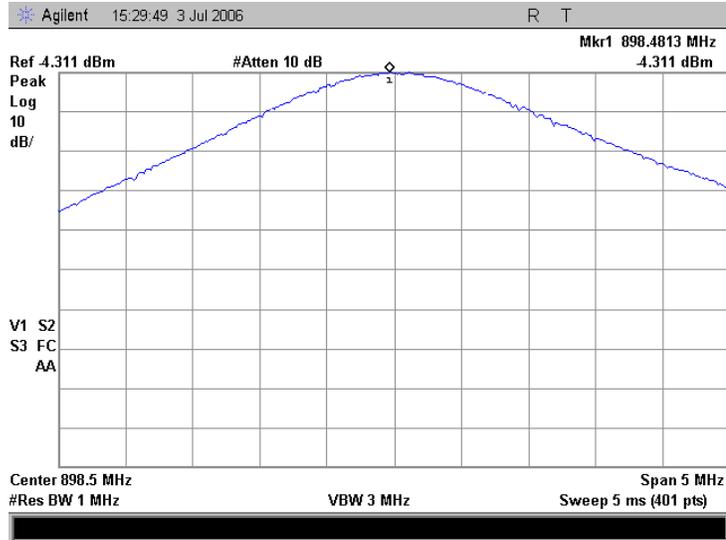
Plot 7.2.8 Occupied bandwidth test result at low frequency, iDEN 900



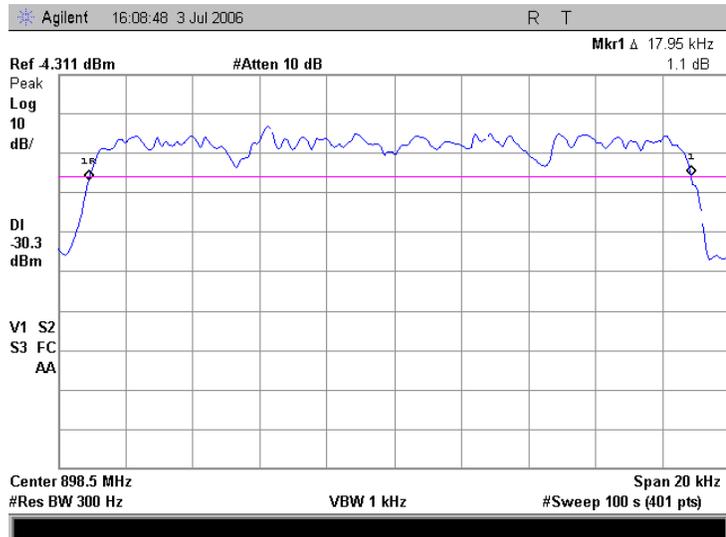


<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.2.9 Reference peak power level at mid frequency, iDEN 900



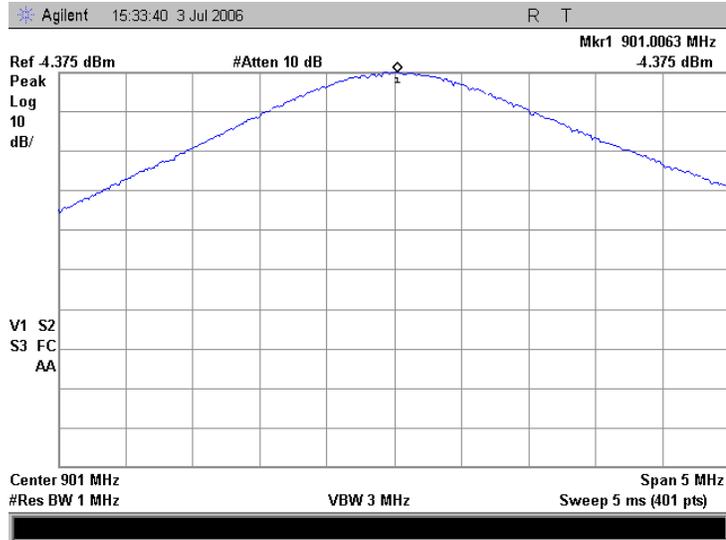
Plot 7.2.10 Occupied bandwidth test result at mid frequency, iDEN 900



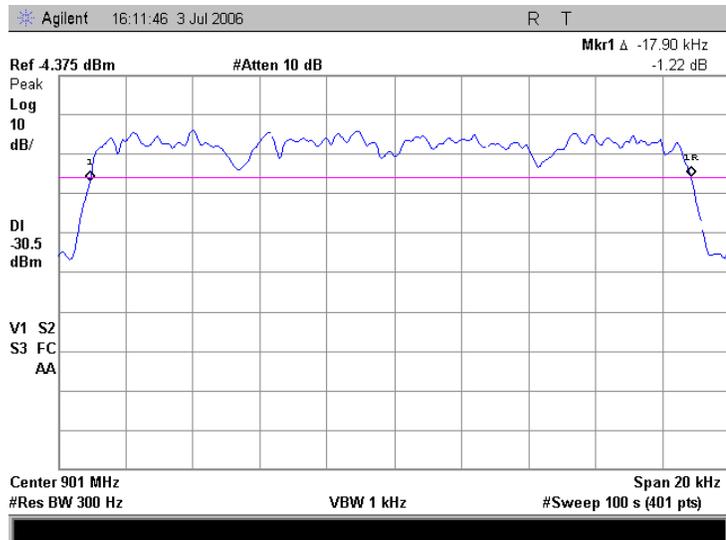


<b>Test specification:</b>	<b>Sections 90.209, 90.691, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 4:15:09 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.2.11 reference peak power level at high frequency, iDEN 900



Plot 7.2.12 Occupied bandwidth test result at high frequency, iDEN 900





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<b>Test specification:</b>		<b>Section 90.210, 90.669, 90.691, Emission mask</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1051, 2.1047 and 90.210(m); TIA/EIA-603-A, Section 2.2.13	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 3:42:18 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

### 7.3 Emission mask test

#### 7.3.1 General

This test was performed to measure emission mask at RF antenna connector. Specification test limits are given in Table 7.3.1. The test results are provided in the plots of Annex 2– this measurement data were taken from the i760 FCC ID:AZ489FT5844 which is being used in the M710 product.

**Table 7.3.1 Emission mask limits**

Frequency displacement from carrier	Attenuation below carrier, dBc
Emission mask according to 90.691	
0 – 12.5 kHz	0
12.5-15.2 kHz	36.0 – 80.0*
More than 15.2 kHz	50+10logP(W) or 80.0 whichever is the lesser

\* - linearly increase with frequency according to:  $116 \cdot \log(f/6.1)$ .

\*\* - emission mask includes carrier modulation envelope within  $\pm 250$  % of the authorized bandwidth; the frequency range removed beyond  $\pm 250$  % of the authorized bandwidth from carrier was investigated as spurious emission



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<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 7.4 Radiated spurious emission measurements

### 7.4.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Radiated spurious emission test limits

Frequency, MHz	Attenuation below carrier dBc	ERP of spurious, dBm	Equivalent field strength limit @ 3m, dB(μV/m)***
0.009 – 10th harmonic*	50+10logP**	-20	77.4

\* - Excluding the in band emission within ± 250 % of the authorized bandwidth from the carrier

\*\* - P is transmitter output power in Watts

\*\*\* - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows:  $E = \sqrt{30 \times P \times 1.64} / r$ , where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

### 7.4.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and the performance check was conducted.

7.4.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

7.4.2.3 The worst test results (the lowest margins) were recorded in Table 7.4.2 and shown in the associated plots.

### 7.4.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.4.3.1 The EUT was set up as shown in Figure 7.4.2, energized and the performance check was conducted.

7.4.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.4.3.3 The worst test results (the lowest margins) were recorded in Table 7.4.2 and shown in the associated plots.



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<b>Test specification:</b> Section 90.210, Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 7/4/2006 12:26:16 PM			
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Figure 7.4.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

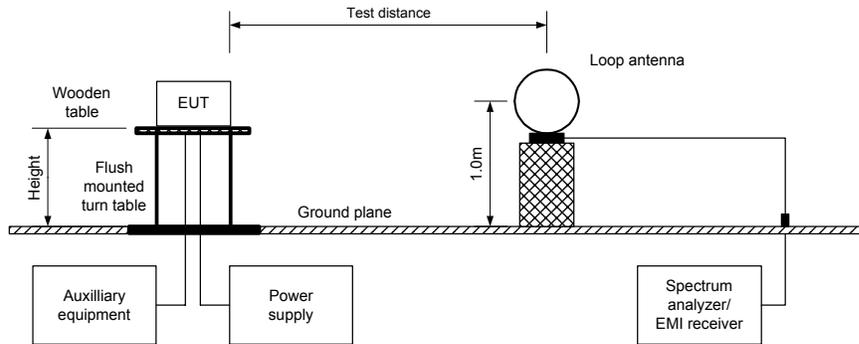
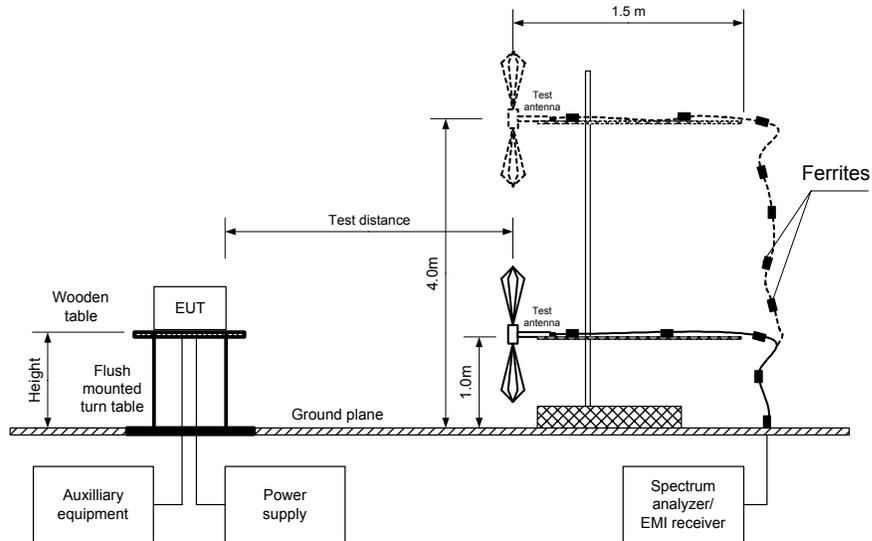


Figure 7.4.2 Setup for spurious emission field strength measurements above 30 MHz





HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 7.4.2 Spurious emission field strength test results**

ASSIGNED FREQUENCY RANGE: 806-824/896-901 MHz  
 TEST DISTANCE: 3 m  
 TEST SITE: OATS  
 EUT HEIGHT: 0.8 m  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 10000 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)  
 Double ridged guide (above 1000 MHz)  
 MODULATION: 16QAM  
 MODULATING SIGNAL: IDEN  
 BIT RATE: 54 Mbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
All spurious were found at least 20 dB below the limit							

**Verdict: Pass**

\*- Margin = Field strength of spurious – calculated field strength limit.

\*\* - EUT front panel refers to 0 degrees position of turntable.

**Reference numbers of test equipment used**

HL 0038	HL 0091	HL 0287	HL 0446	HL 1424	HL 1425	HL 1553	HL 1566
HL 1849	HL 1850	HL 1942	HL 1984	HL 2109	HL 2254	HL 2259	HL 2400
HL 2432	HL 2697						

Full description is given in Appendix A.

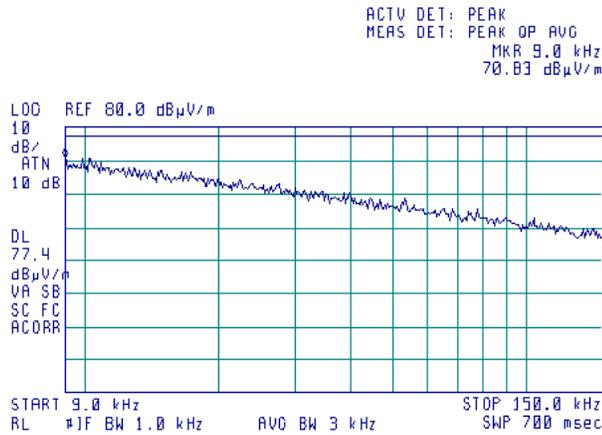


HERMON LABORATORIES

<b>Test specification:</b> Section 90.210, Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 7/4/2006 12:26:16 PM			
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

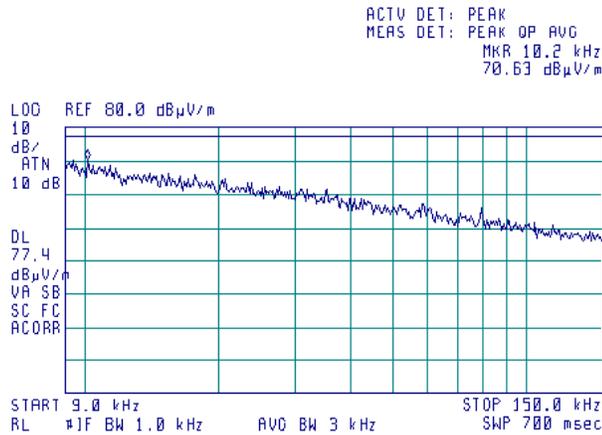
**Plot 7.4.1 Radiated emission measurements in 9 - 150 kHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Low  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



**Plot 7.4.2 Radiated emission measurements in 9 - 150 kHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Mid  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



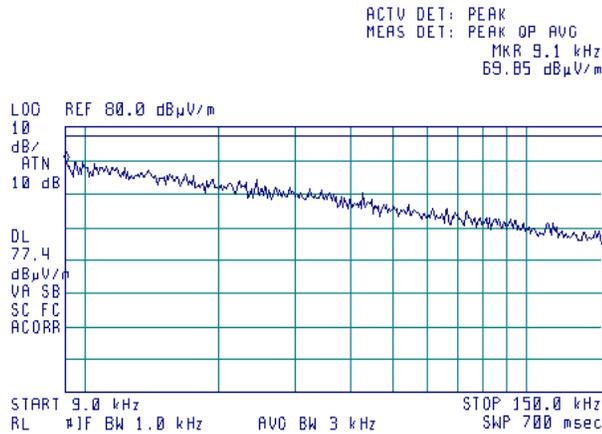


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

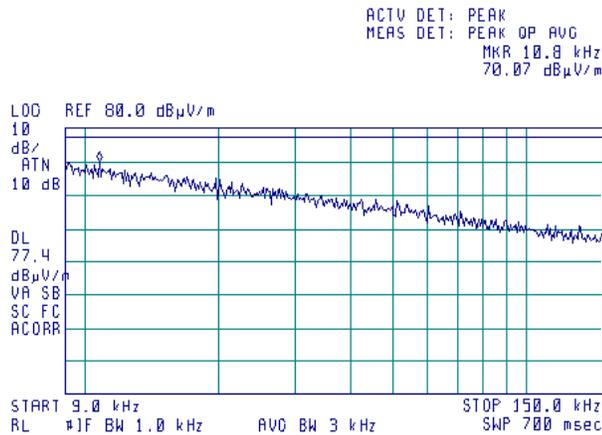
Plot 7.4.3 Radiated emission measurements in 9 - 150 kHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 High  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



Plot 7.4.4 Radiated emission measurements in 9 - 150 kHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Low  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



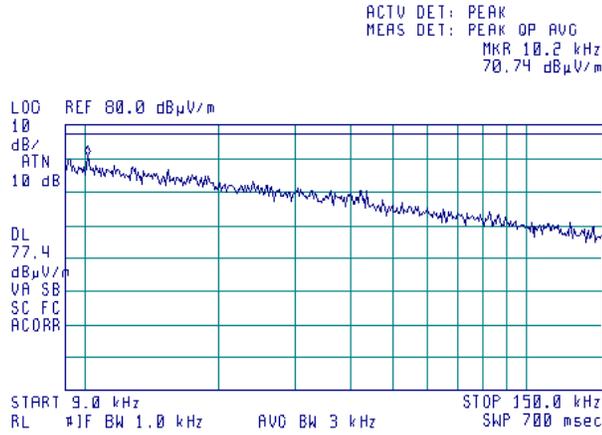


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

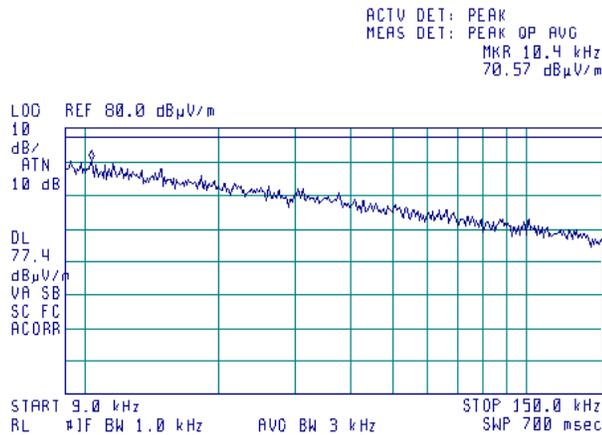
**Plot 7.4.5 Radiated emission measurements in 9 - 150 kHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Mid  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



**Plot 7.4.6 Radiated emission measurements in 9 - 150 kHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 High  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



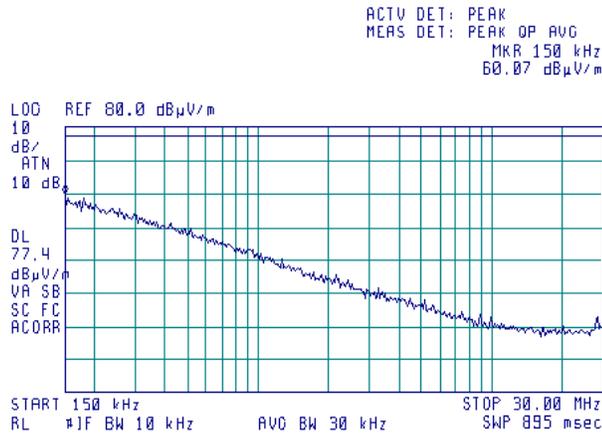


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

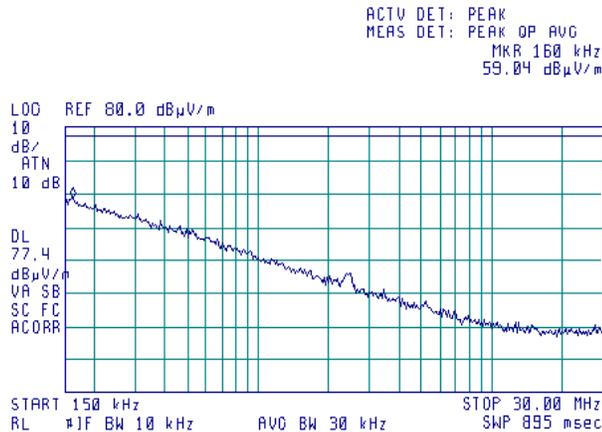
Plot 7.4.7 Radiated emission measurements in 0.15 - 30 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Low  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



Plot 7.4.8 Radiated emission measurements in 0.15 - 30 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Mid  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m

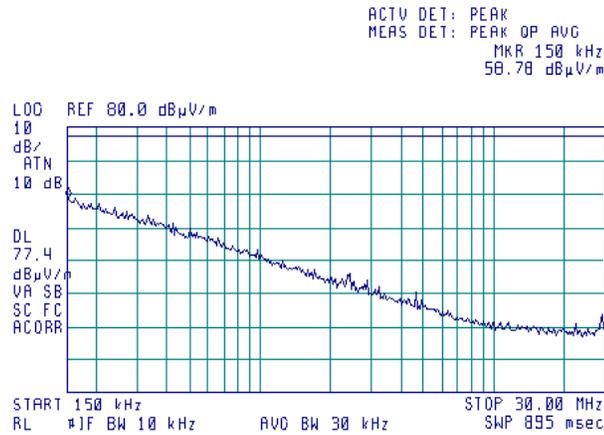




<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

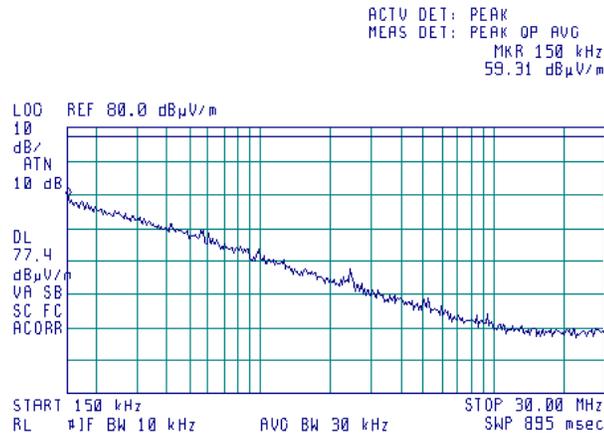
**Plot 7.4.9 Radiated emission measurements in 0.15 - 30 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 High  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



**Plot 7.4.10 Radiated emission measurements in 0.15 - 30 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Low  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



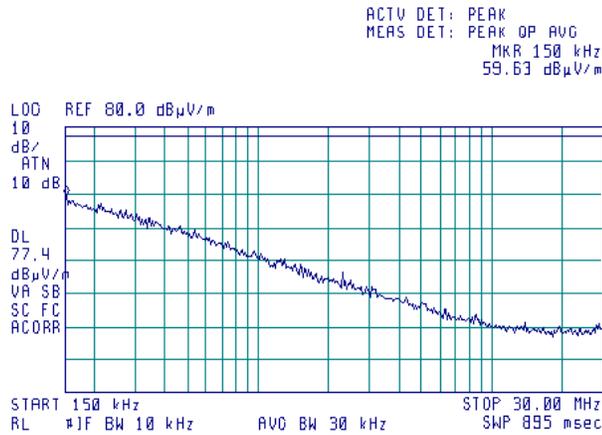


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

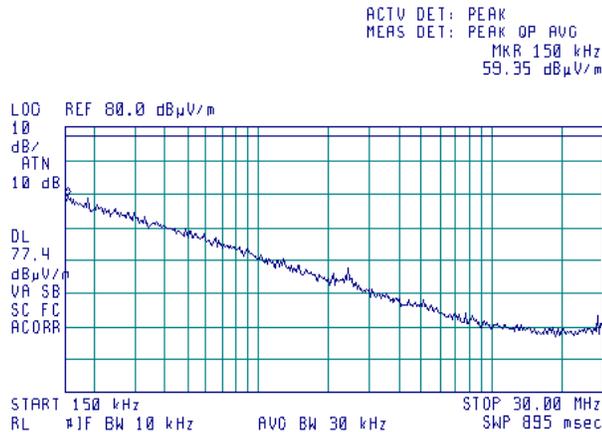
**Plot 7.4.11 Radiated emission measurements in 0.15 - 30 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Mid  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



**Plot 7.4.12 Radiated emission measurements in 0.15 - 30 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 High  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



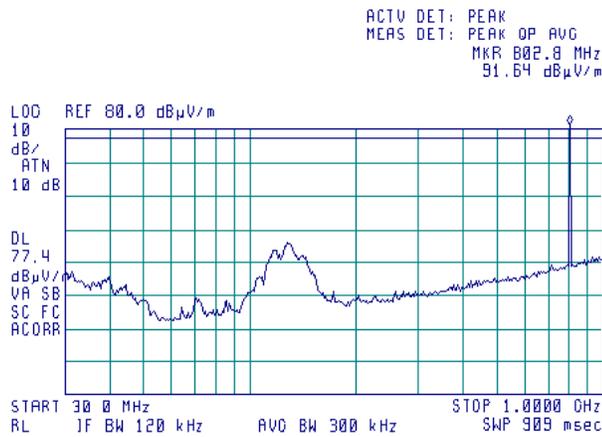


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

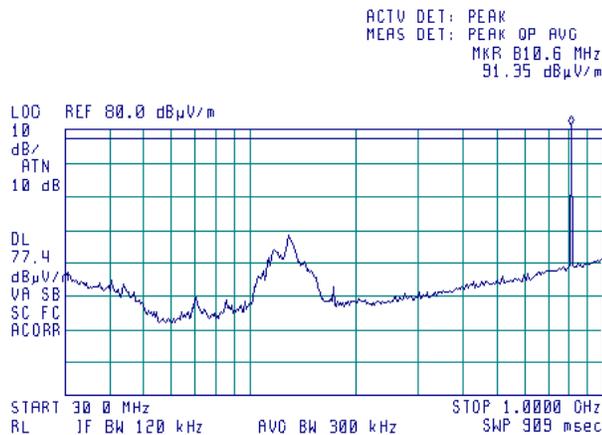
**Plot 7.4.13 Radiated emission measurements in 30 - 1000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



**Plot 7.4.14 Radiated emission measurements in 0.15 - 30 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



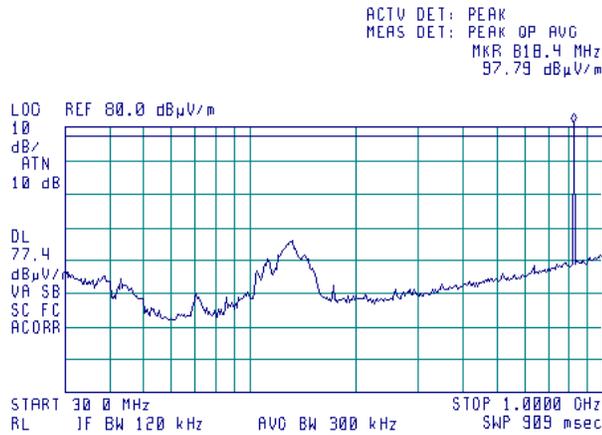


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

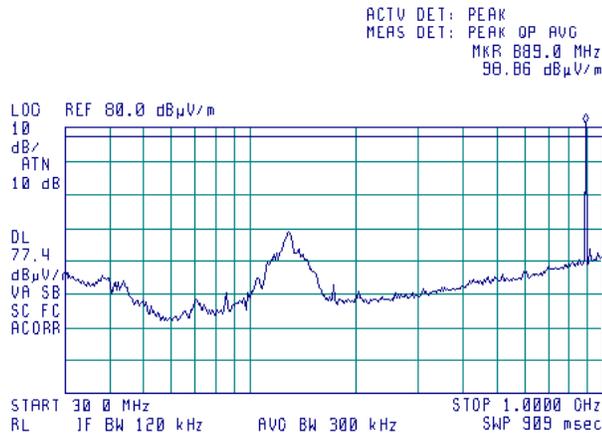
**Plot 7.4.15 Radiated emission measurements in 30 - 1000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



**Plot 7.4.16 Radiated emission measurements in 30 - 1000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



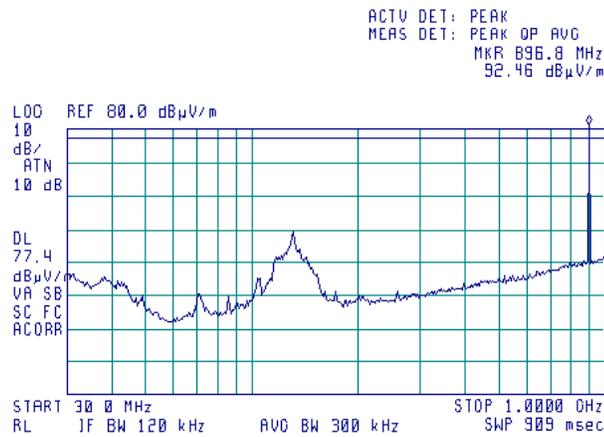


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

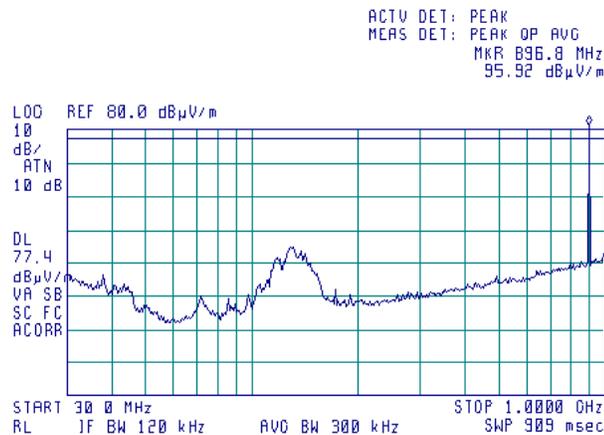
**Plot 7.4.17 Radiated emission measurements in 30 - 1000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



**Plot 7.4.18 Radiated emission measurements in 30 - 1000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



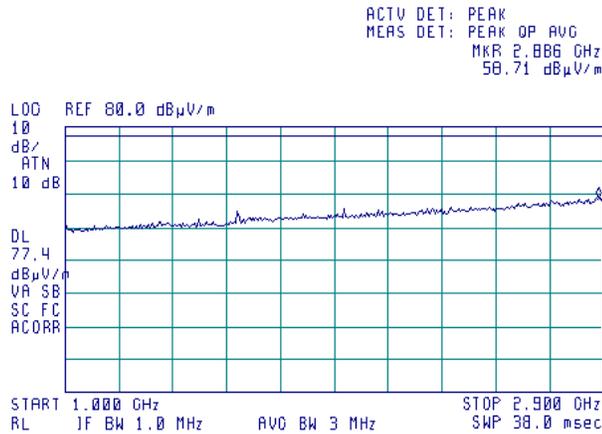


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

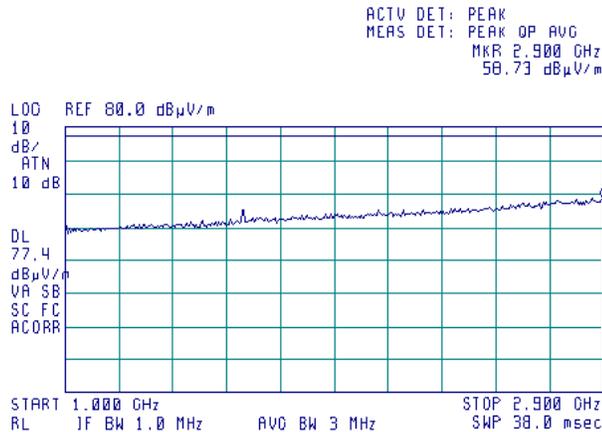
Plot 7.4.19 Radiated emission measurements in 1000 – 2900 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.20 Radiated emission measurements in 1000 – 2900 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



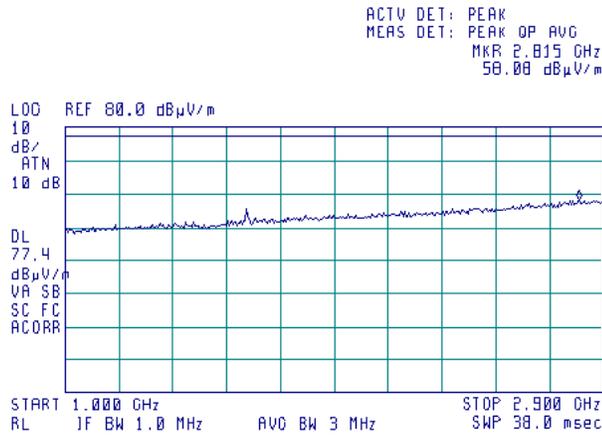


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

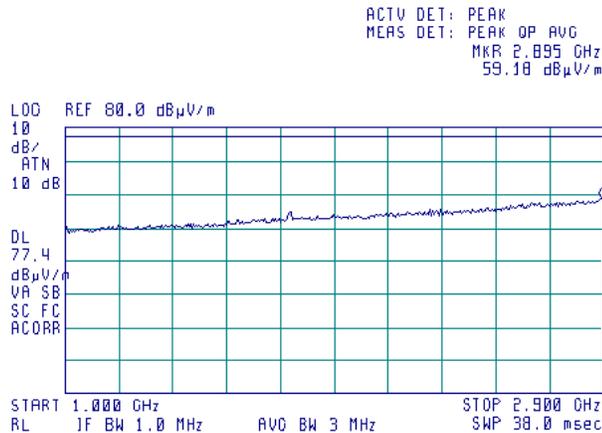
Plot 7.4.21 Radiated emission measurements in 1000 – 2900 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.22 Radiated emission measurements in 1000 – 2900 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



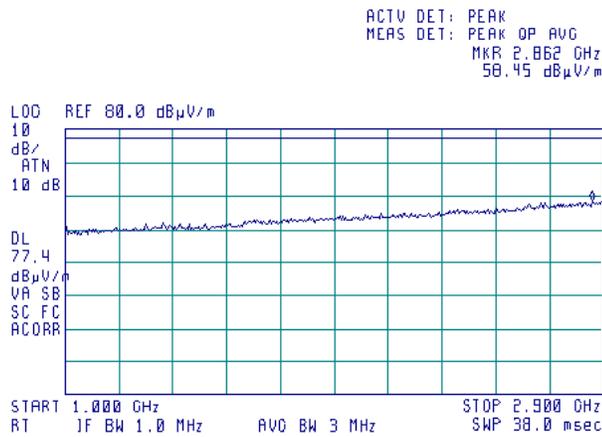


HERMON LABORATORIES

<b>Test specification:</b> Section 90.210, Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 7/4/2006 12:26:16 PM			
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

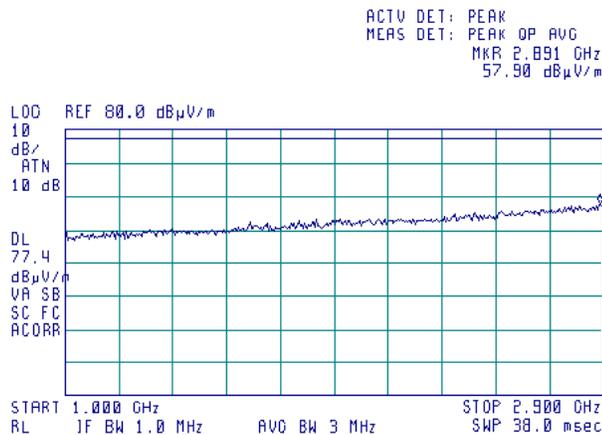
Plot 7.4.23 Radiated emission measurements in 1000 – 2900 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.24 Radiated emission measurements in 1000 – 2900 MHz range

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m





<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Plot 7.4.25 Radiated emission measurements in 2900 – 10000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



**Plot 7.4.26 Radiated emission measurements in 2900 – 10000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m





<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Plot 7.4.27 Radiated emission measurements in 2900 – 10000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 800 High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



**Plot 7.4.28 Radiated emission measurements in 2900 – 10000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m





<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Plot 7.4.29 Radiated emission measurements in 2900 – 10000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



**Plot 7.4.30 Radiated emission measurements in 2900 – 10000 MHz range**

TEST SITE: Fully anechoic chamber  
 CARRIER FREQUENCY: IDEN 900 High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



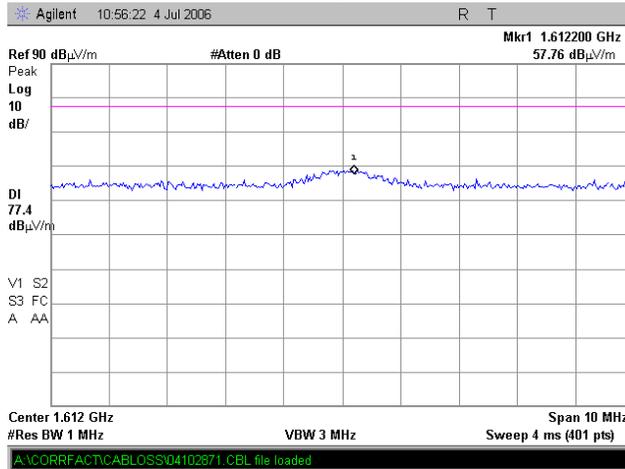


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

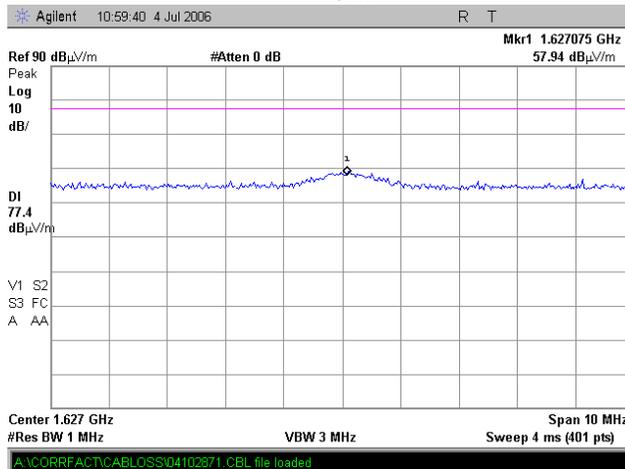
Plot 7.4.31 Radiated emission measurements at the 2<sup>nd</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.32 Radiated emission measurements at the 2<sup>nd</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



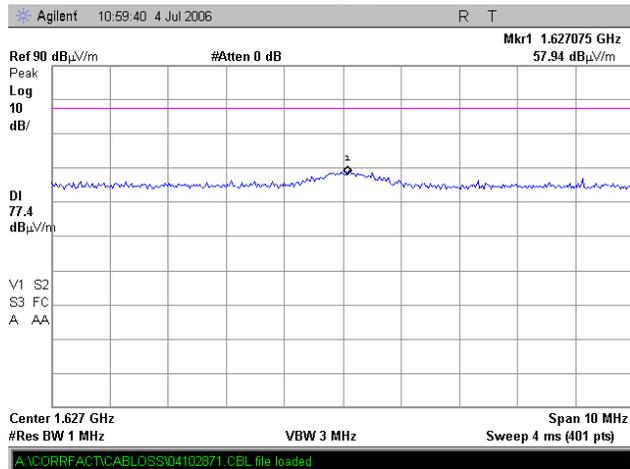


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

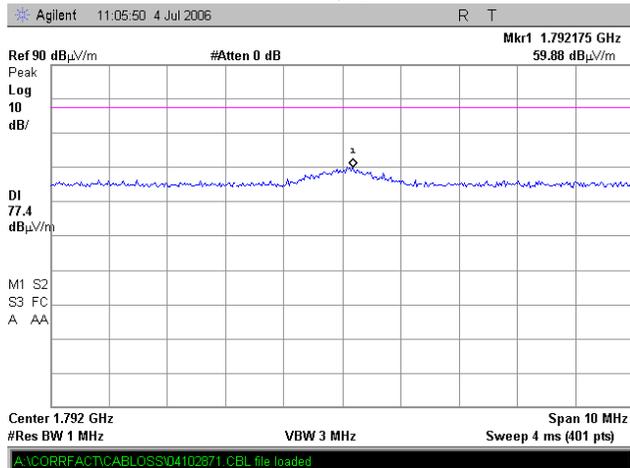
Plot 7.4.33 Radiated emission measurements at the 2<sup>nd</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.34 Radiated emission measurements at the 2<sup>nd</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m

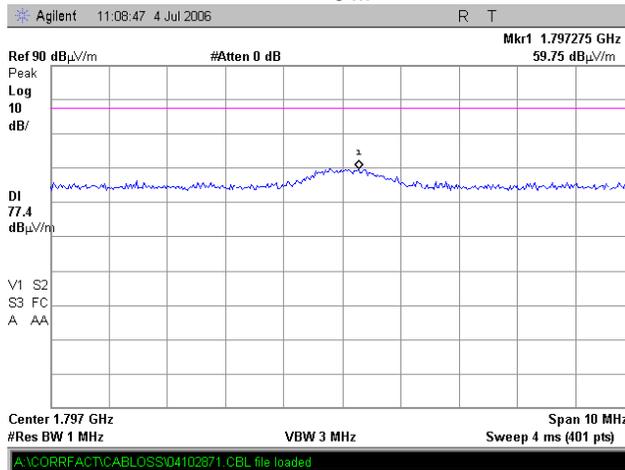




<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

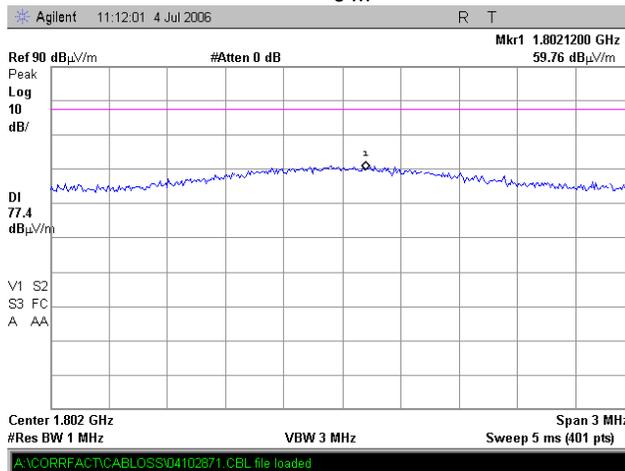
Plot 7.4.35 Radiated emission measurements at the 2<sup>nd</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.36 Radiated emission measurements at the 2<sup>nd</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



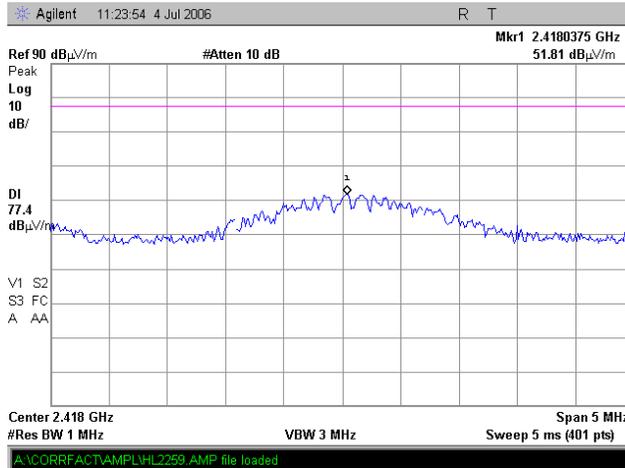


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<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

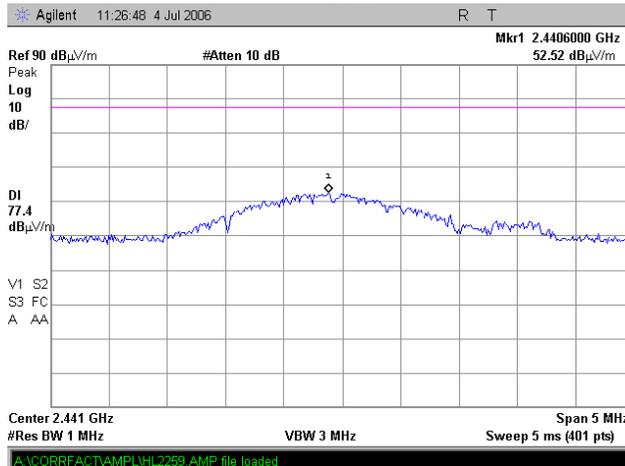
Plot 7.4.37 Radiated emission measurements at the 3<sup>rd</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.38 Radiated emission measurements at the 3<sup>rd</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m

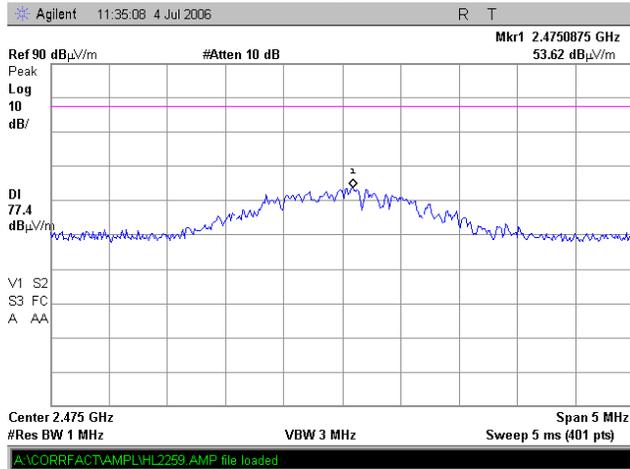




<b>Test specification:</b> Section 90.210, Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 7/4/2006 12:26:16 PM			
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

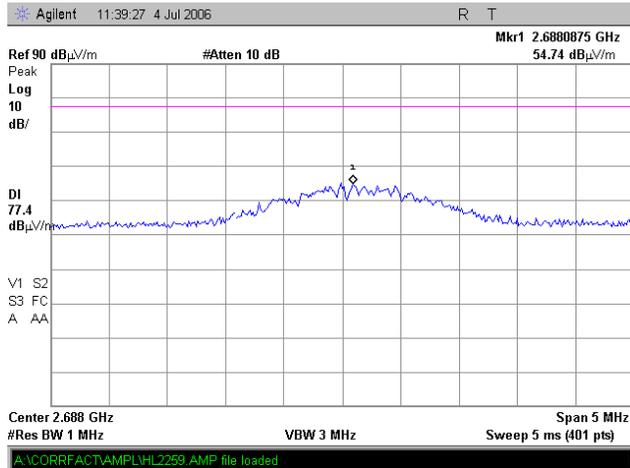
Plot 7.4.39 Radiated emission measurements at the 3<sup>rd</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.40 Radiated emission measurements at the 3<sup>rd</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m

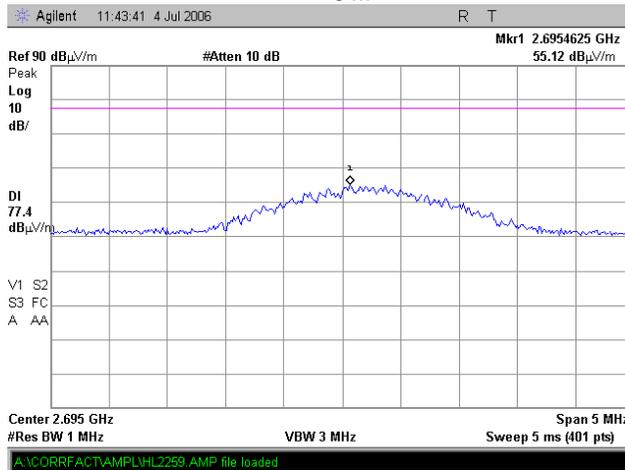




<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

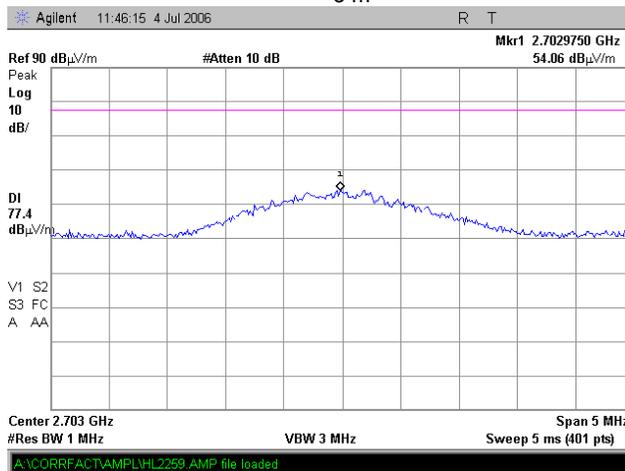
Plot 7.4.41 Radiated emission measurements at the 3<sup>rd</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.42 Radiated emission measurements at the 3<sup>rd</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m

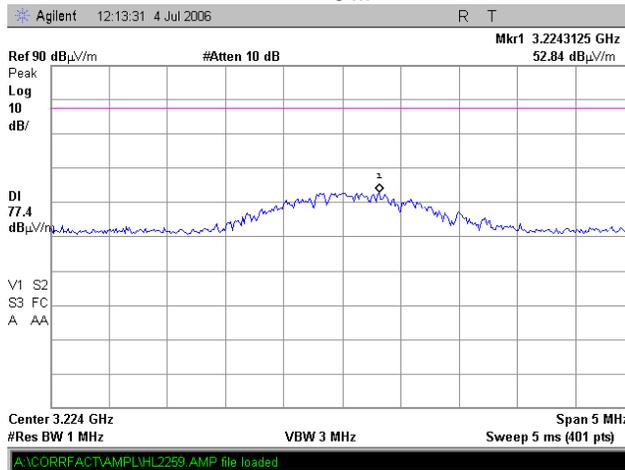




<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

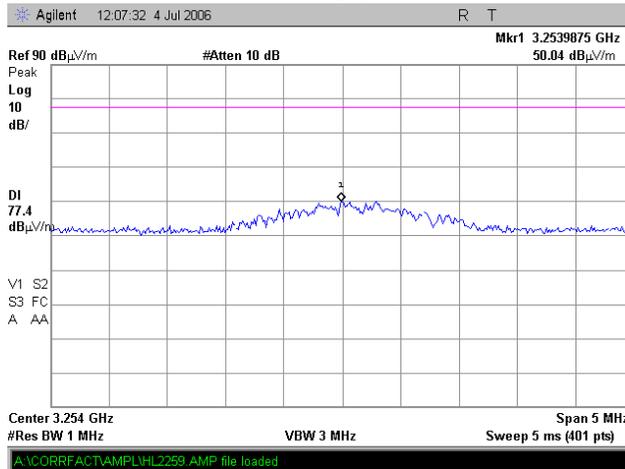
Plot 7.4.43 Radiated emission measurements at the 4<sup>th</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.44 Radiated emission measurements at the 4<sup>th</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



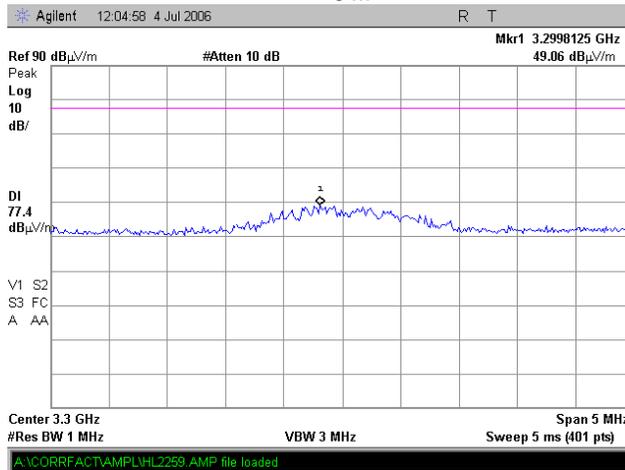


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<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

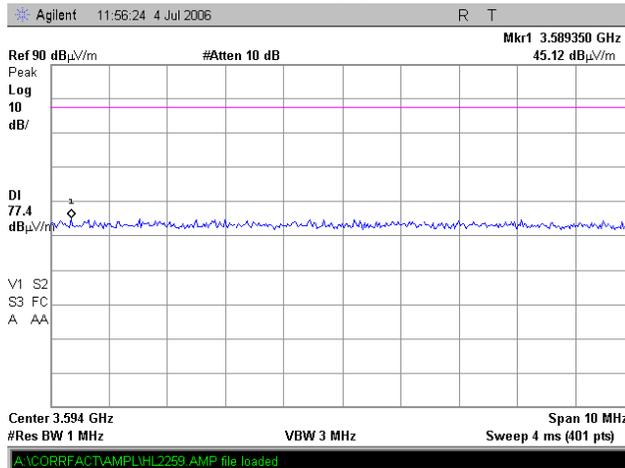
Plot 7.4.45 Radiated emission measurements at the 4<sup>th</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.46 Radiated emission measurements at the 4<sup>th</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m

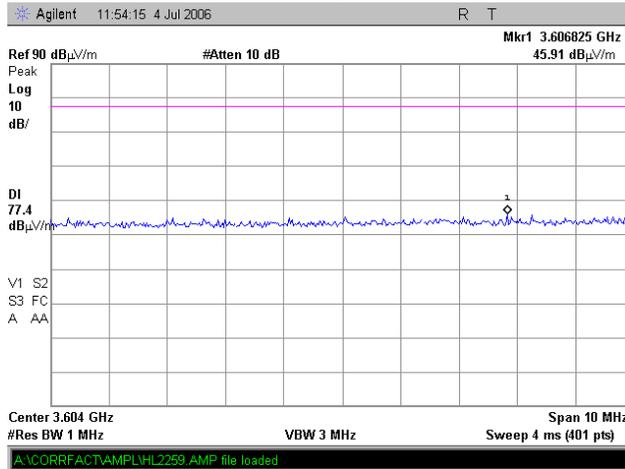




<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

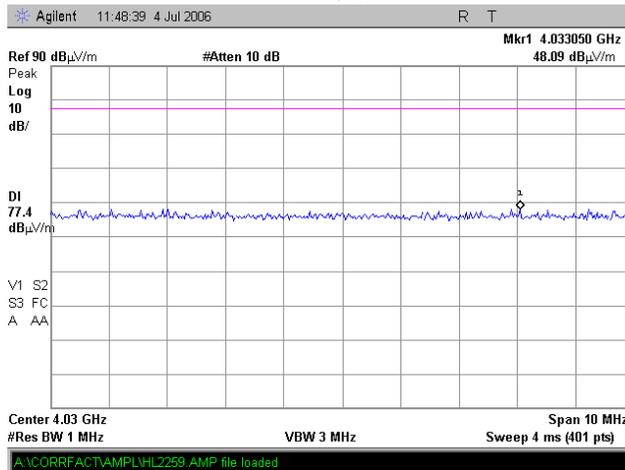
Plot 7.4.47 Radiated emission measurements at the 4<sup>th</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.48 Radiated emission measurements at the 4<sup>th</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



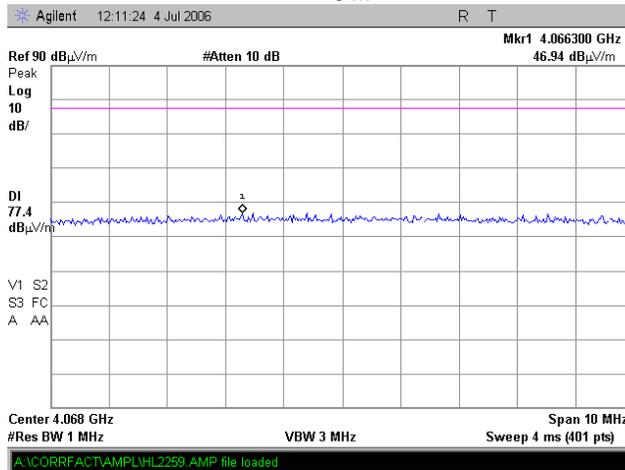


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<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

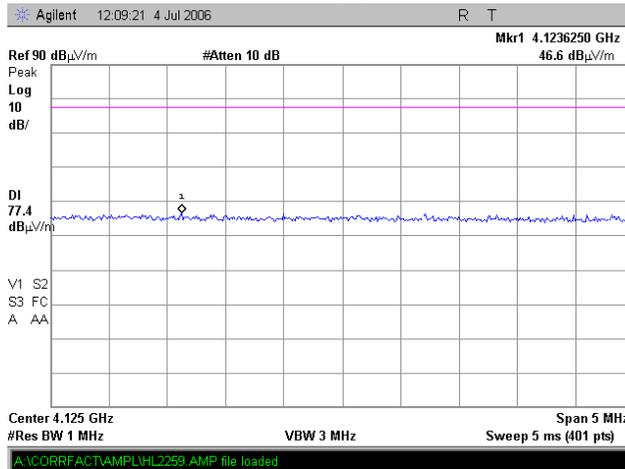
Plot 7.4.49 Radiated emission measurements at the 5<sup>th</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.50 Radiated emission measurements at the 5<sup>th</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



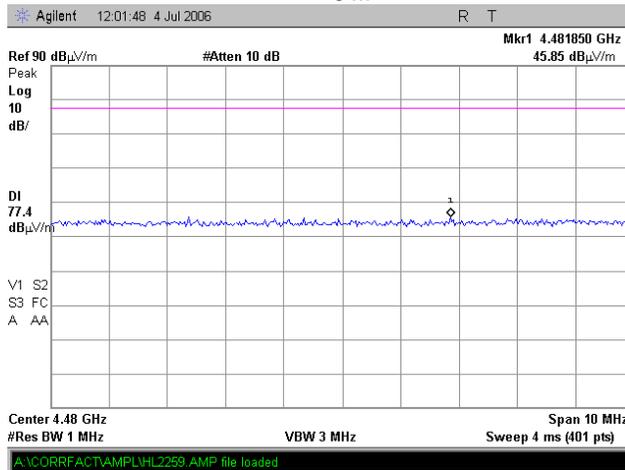


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<b>Test specification:</b>	<b>Section 90.210, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 12:26:16 PM		
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

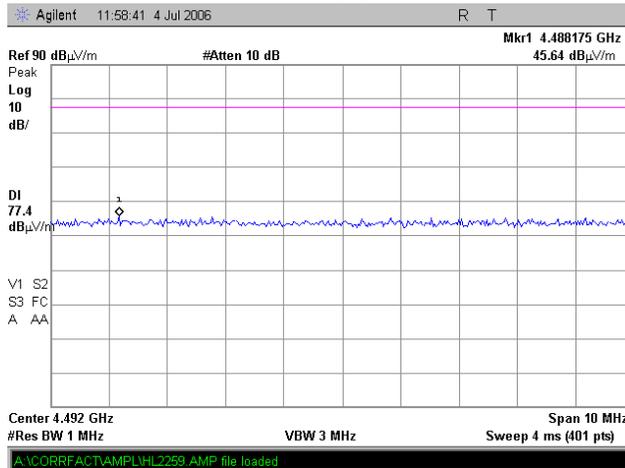
Plot 7.4.51 Radiated emission measurements at the 5<sup>th</sup> harmonic iDEN 800

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.52 Radiated emission measurements at the 5<sup>th</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m

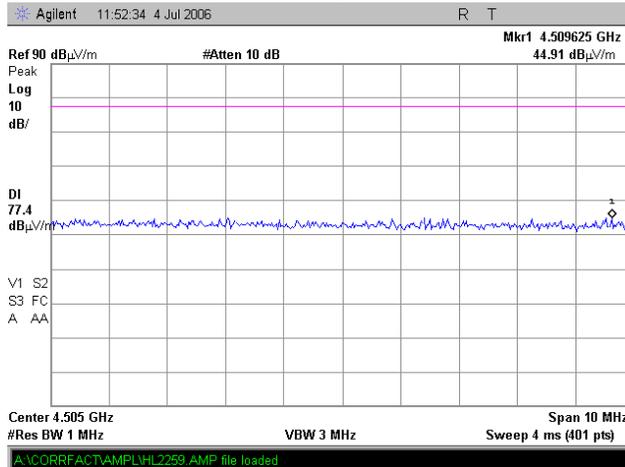




<b>Test specification:</b> Section 90.210, Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 7/4/2006 12:26:16 PM			
<b>Temperature:</b> 25 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

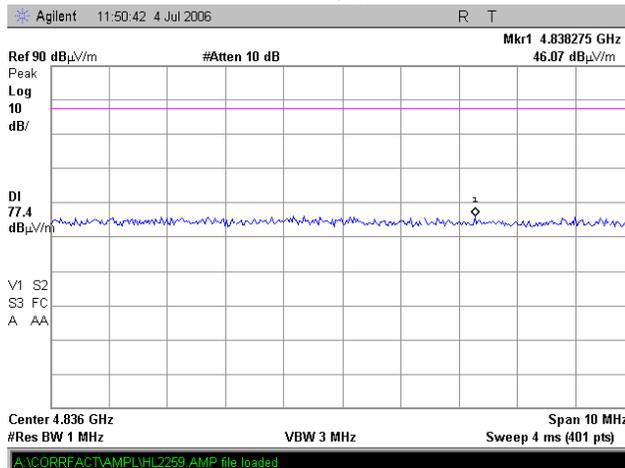
Plot 7.4.53 Radiated emission measurements at the 5<sup>th</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m



Plot 7.4.54 Radiated emission measurements at the 5<sup>th</sup> harmonic iDEN 900

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical & Horizontal  
 TEST DISTANCE: 3 m





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<b>Test specification:</b>		<b>Section 90.210, Conducted spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 7.5 Spurious emissions at RF antenna connector test

### 7.5.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.5.1. The test results are provided in Table 7.5.2 and associated plots.

**Table 7.5.1 Spurious emission limits**

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm
0.009 – 10th harmonic*	43+10logP** (mask B, C)	-13.0
0.009 – 10th harmonic*	50+10logP** (mask D)	-20.0

\* - spurious emission limits do not apply to the in band emission within  $\pm 250$  % of the authorized bandwidth from the carrier; investigated in course of emission mask testing

\*\* - P is transmitter output power in Watts

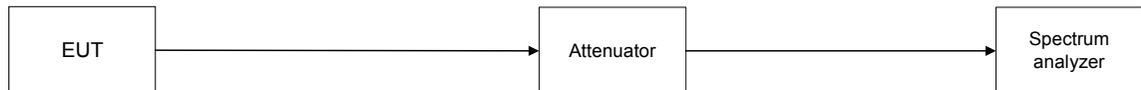
### 7.5.2 Test procedure

**7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.

**7.5.2.2** The EUT was adjusted to produce maximum available for end user RF output power.

**7.5.2.3** The spurious emission was measured with spectrum analyzer as provided in Table 7.5.2 and associated plots.

**Figure 7.5.1 Spurious emission test setup**





HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 7.5.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 808-824/896-901 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 10000 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATION: 16QAM  
 MODULATING SIGNAL: iden  
 BIT RATE: Mbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Attenuation below carrier, dBc	Limit, dBc**	Margin, dB*	Verdict
<b>Low carrier frequency iden 800</b>									
1612	-31.23	included	included	1000	-31.23	61.23	46	-15.23	Pass
2418	-29.54	included	included	1000	-29.54	59.54	46	-13.54	Pass
<b>Low carrier frequency iden 900</b>									
1792	-30.01	included	included	1000	-30.01	60.01	46	-14.01	Pass
2688	-33.31	included	included	1000	-33.31	63.31	46	-17.31	Pass
<b>Mid carrier frequency iden 800</b>									
1627	-30.66	included	included	1000	-30.66	60.66	46	-14.66	Pass
2441	-29.18	included	included	1000	-29.18	59.18	46	-13.18	Pass
<b>Mid carrier frequency iden 900</b>									
1797	-30.03	included	included	1000	-30.03	60.03	46	-14.03	Pass
2695	-34.01	included	included	1000	-34.01	64.01	46	-18.01	Pass
<b>High carrier frequency iden 800</b>									
1650	-30.19	included	included	1000	-30.19	60.19	46	-14.19	Pass
2475	-29.99	included	included	1000	-29.99	59.99	46	-13.99	Pass
<b>High carrier frequency iden 900</b>									
1802	-30.40	included	included	1000	-30.40	60.40	46	-14.40	Pass
2703	-33.88	included	included	1000	-33.88	63.88	46	-17.88	Pass

\*- Margin = Spurious emission – specification limit.  
 \*\* - transmitter output power is 0.4 W.

**Reference numbers of test equipment used**

HL 2634	HL 2909						
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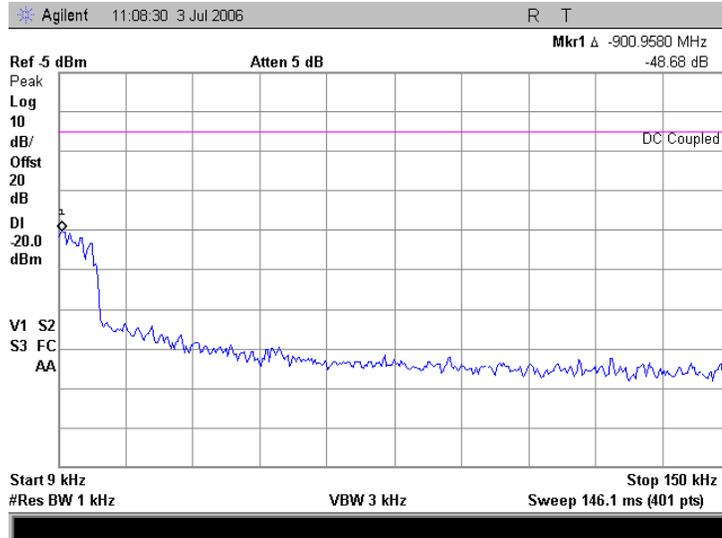
Full description is given in Appendix A.



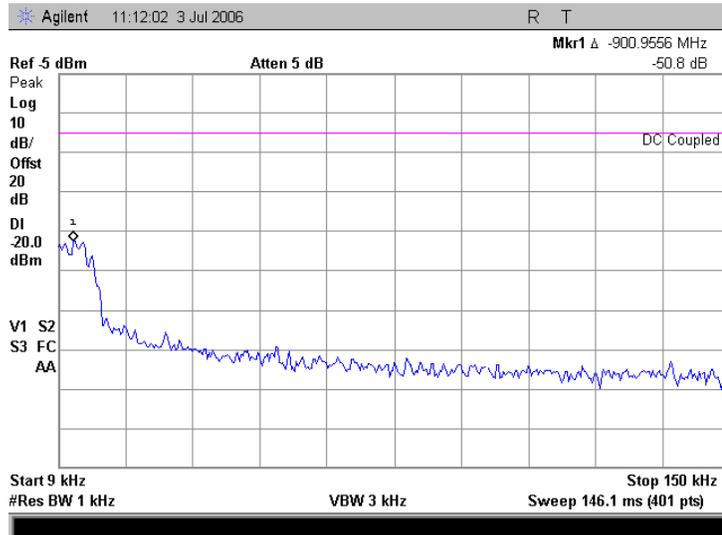
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency, iDEN 800



Plot 7.5.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency, iDEN 800

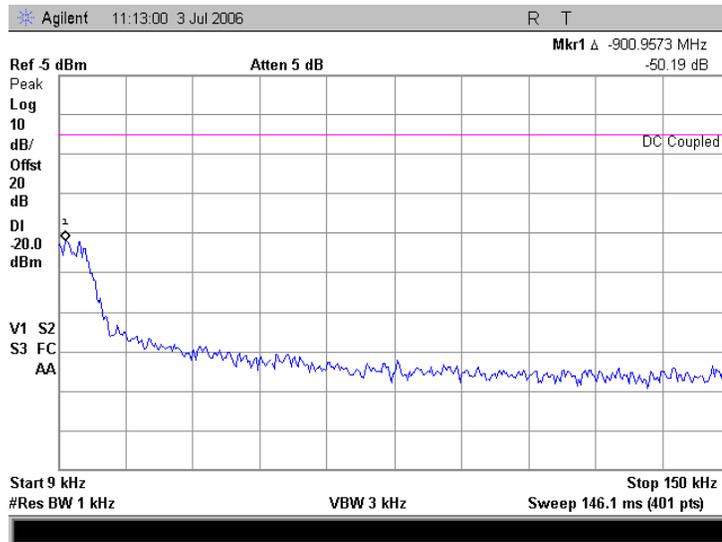




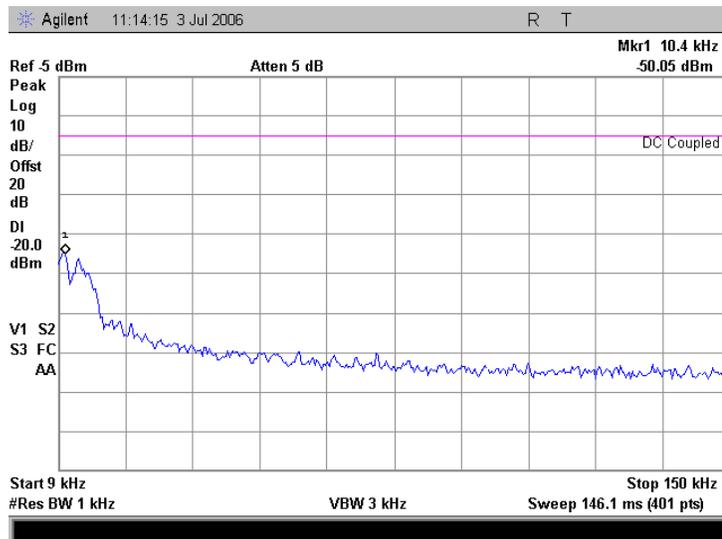
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency, iDEN 800



Plot 7.5.4 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency, iDEN 900

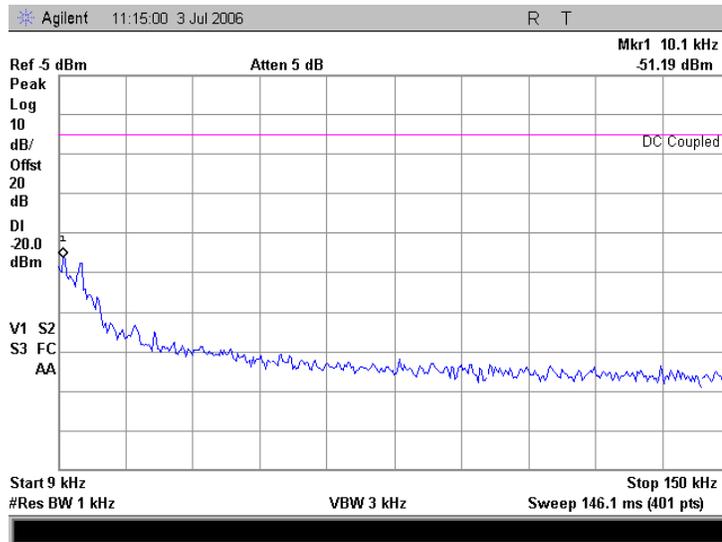




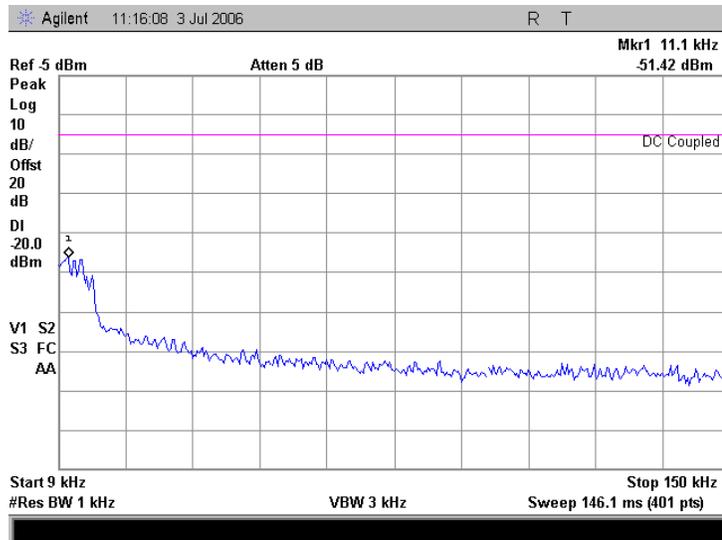
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.5 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency, iDEN 900



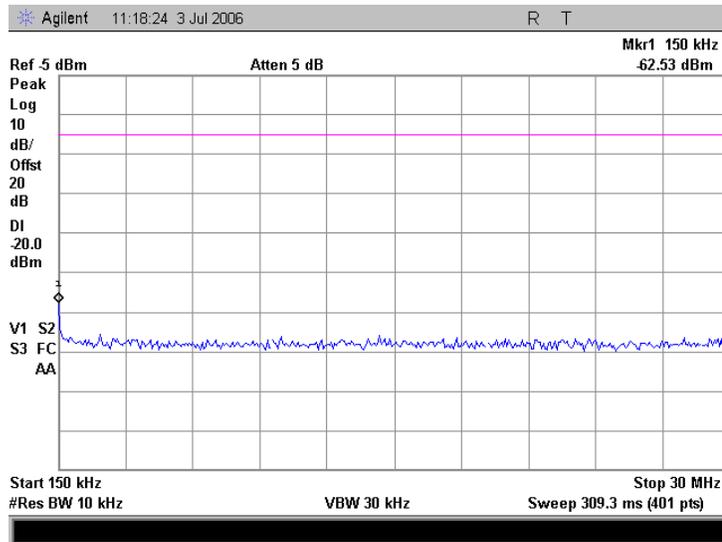
Plot 7.5.6 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency, iDEN 900



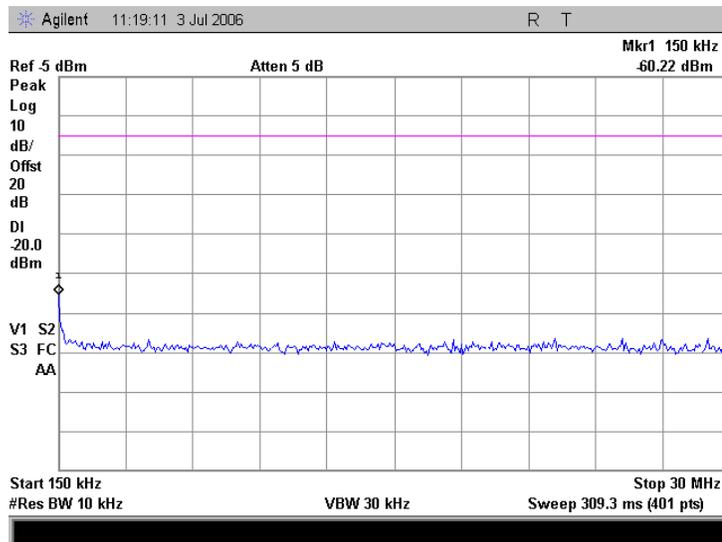


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.7 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency, iDEN 800



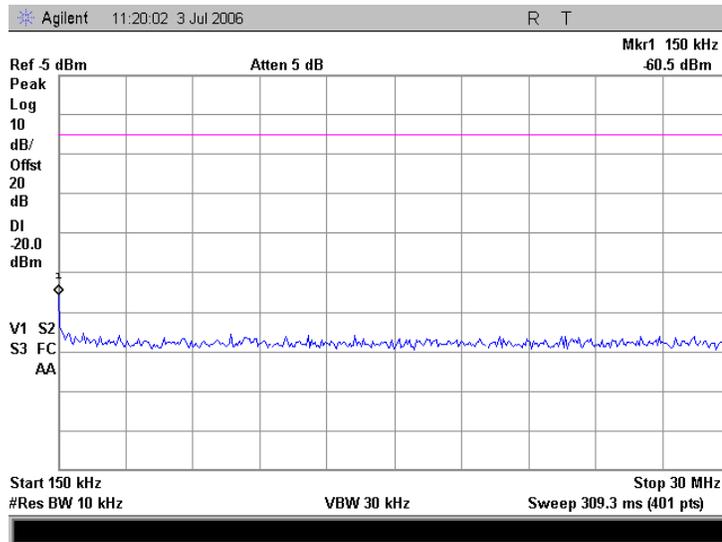
Plot 7.5.8 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency, iDEN 800



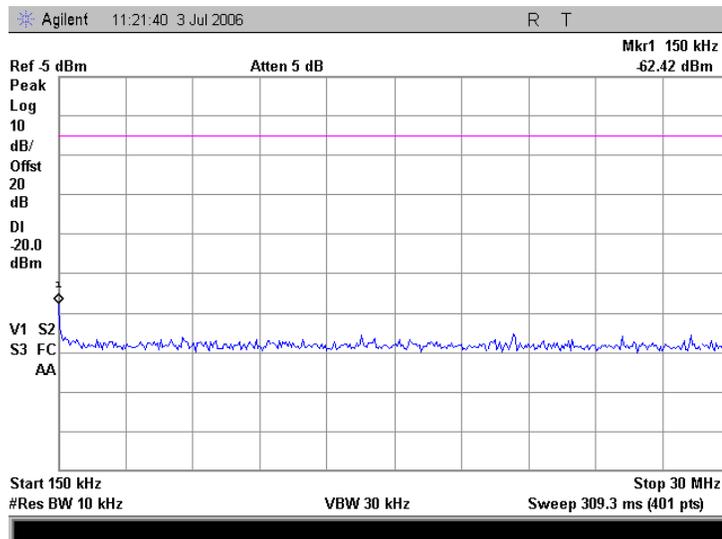


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.9 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency, iDEN 800



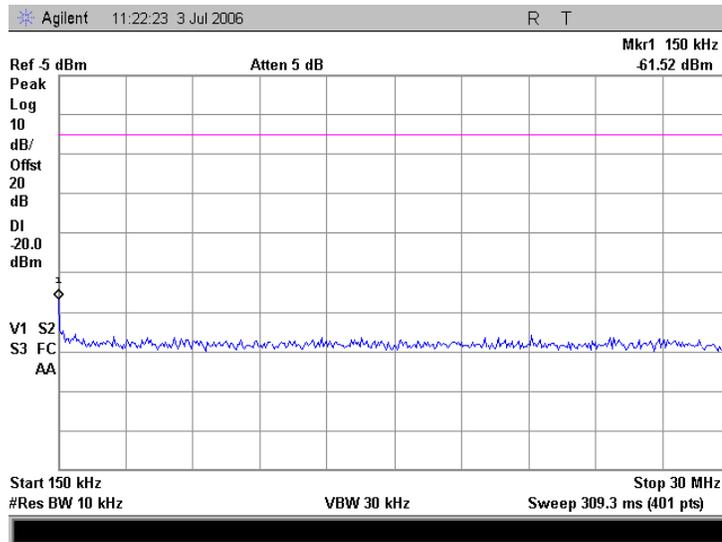
Plot 7.5.10 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency, iDEN 900



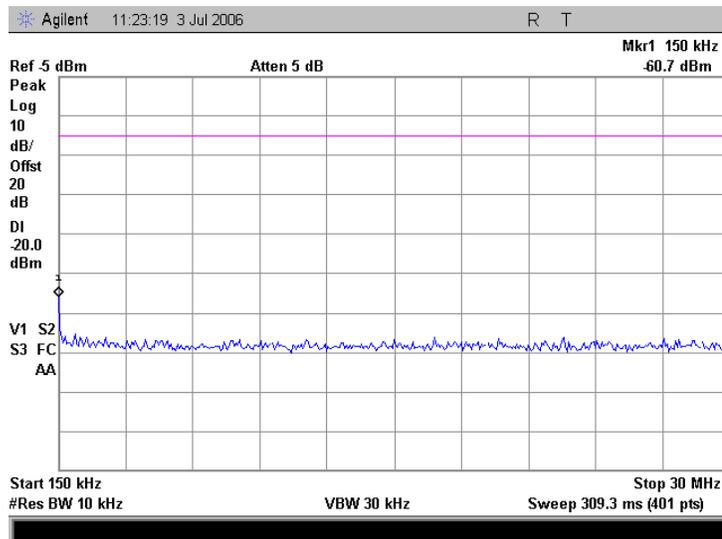


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.11 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency, iDEN 900



Plot 7.5.12 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency, iDEN 900

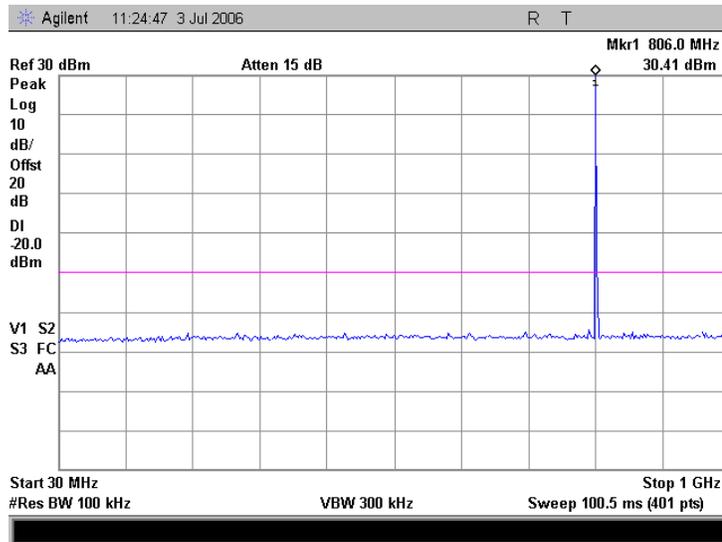




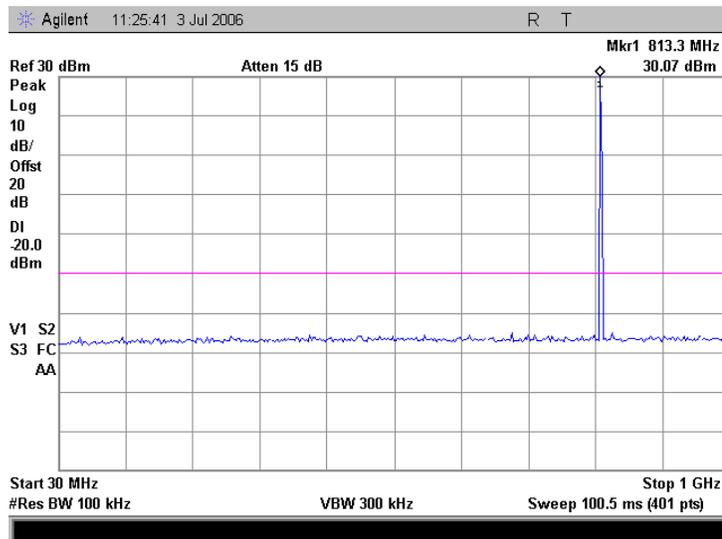
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.13 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency, iDEN 800



Plot 7.5.14 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency, iDEN 800

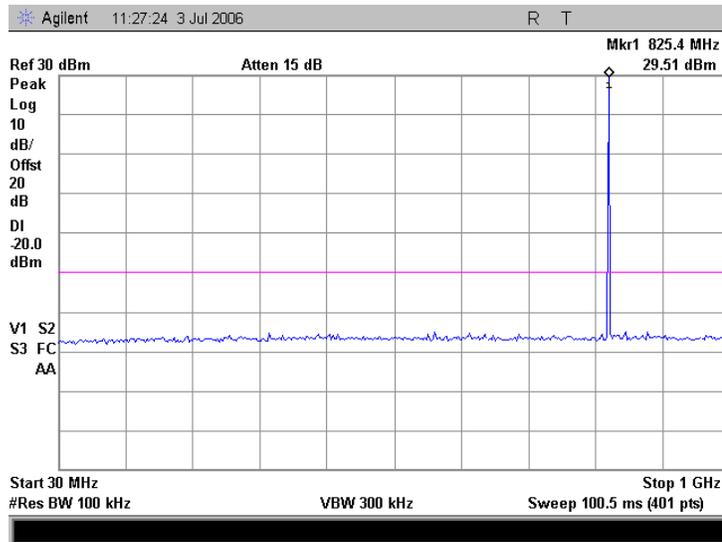




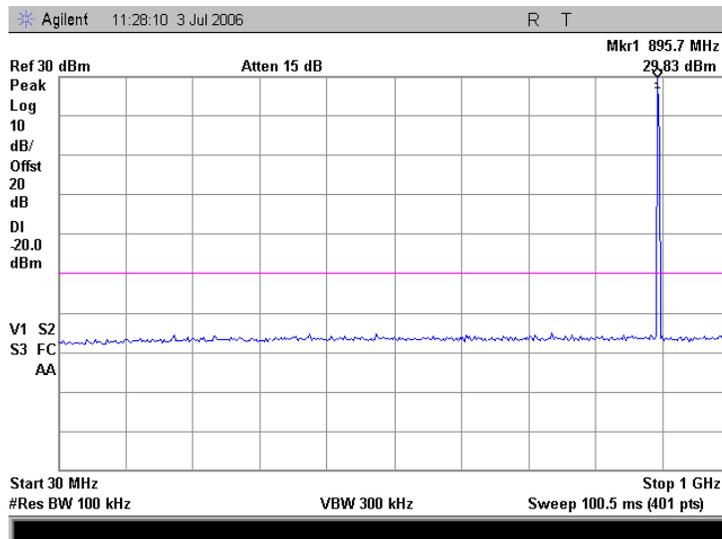
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.15 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency, iDEN 800



Plot 7.5.16 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency, iDEN 900

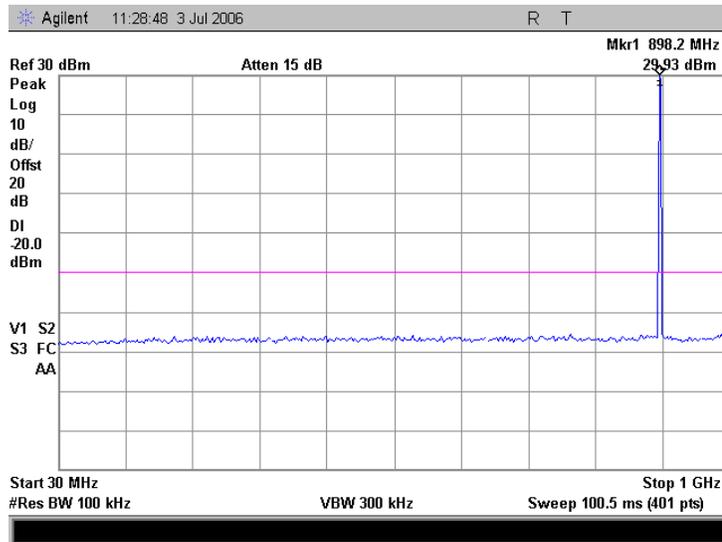




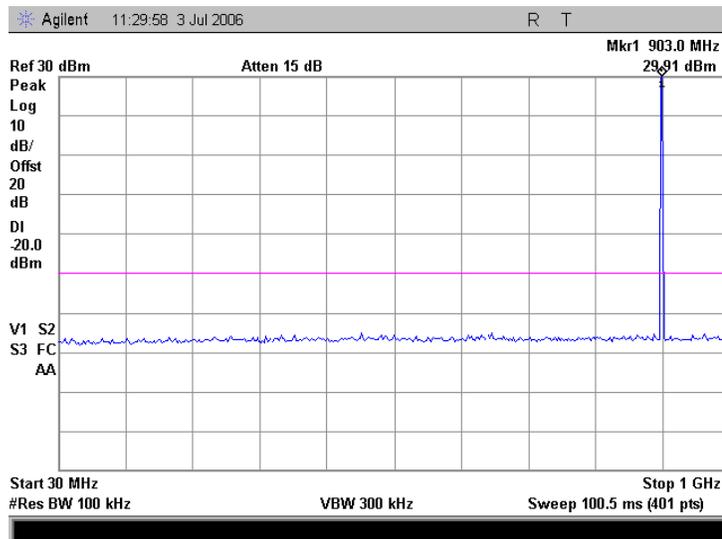
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.17 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency, iDEN 900



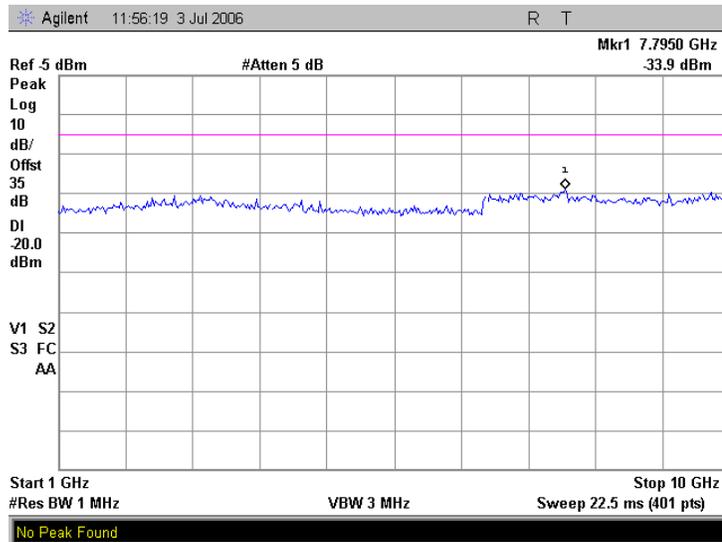
Plot 7.5.18 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency, iDEN 900



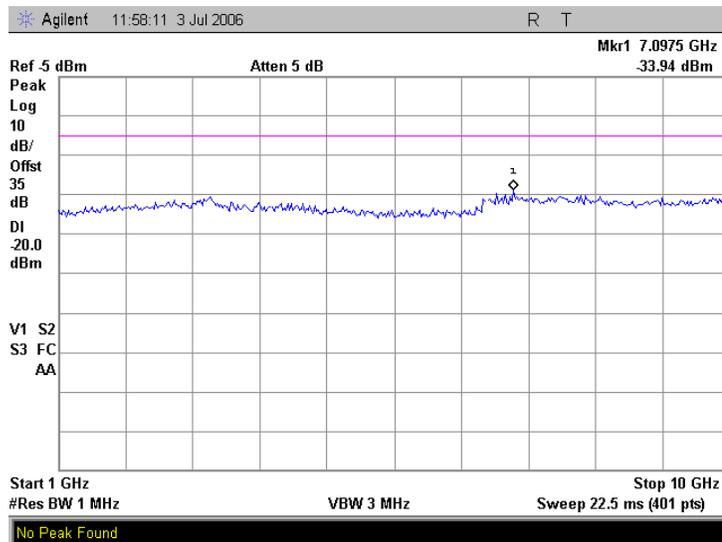


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.19 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency, iDEN 800



Plot 7.5.20 Spurious emission measurements in 1000 - 10000 MHz at mid carrier frequency, iDEN 800

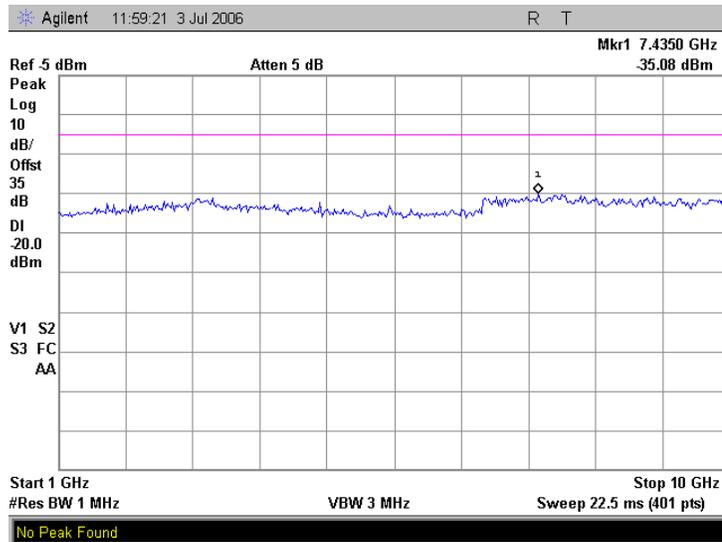




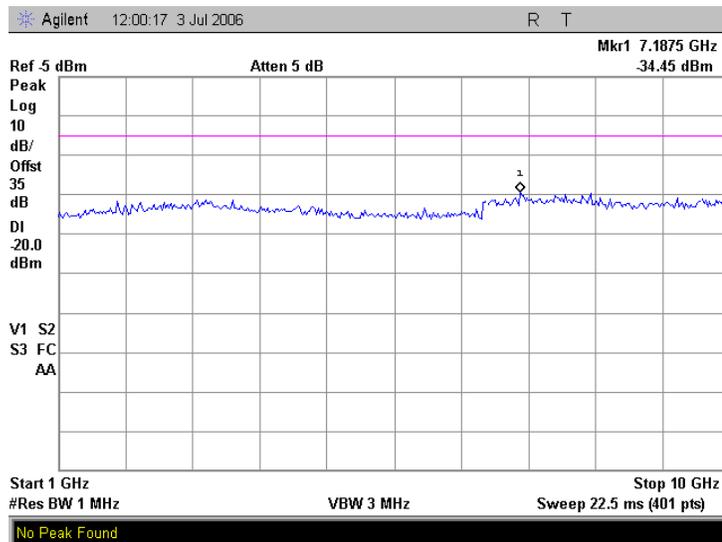
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<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.21 Spurious emission measurements in 1000 - 10000 MHz at high carrier frequency, iDEN 800



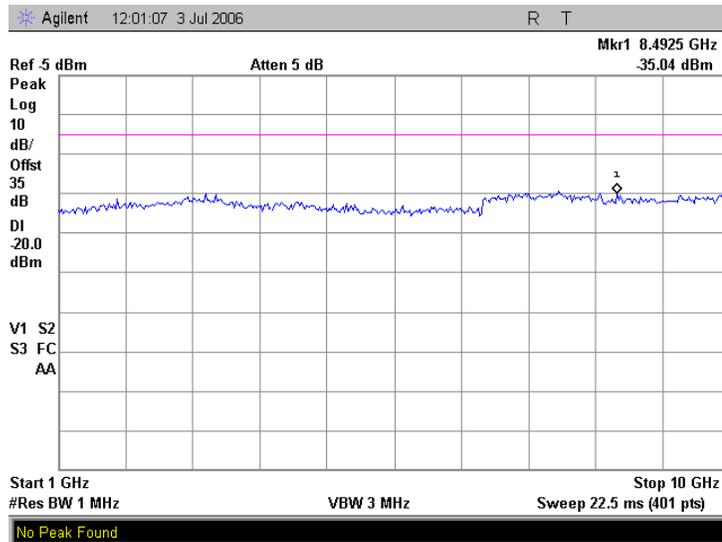
Plot 7.5.22 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency, iDEN 900



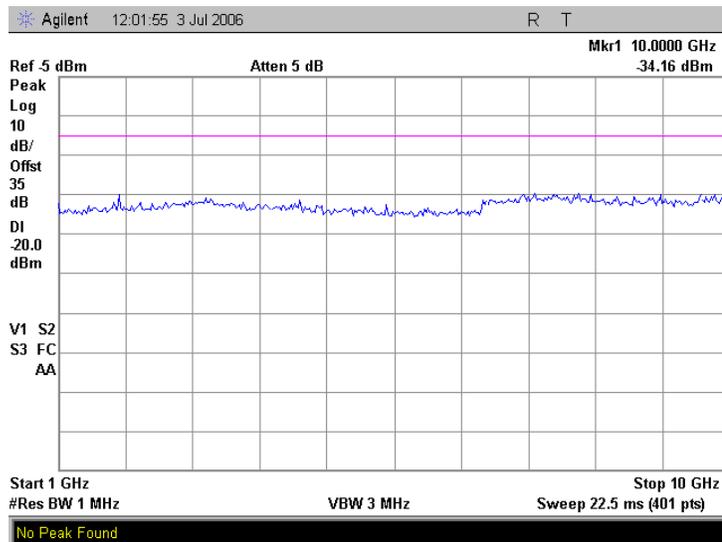


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.23 Spurious emission measurements in 1000 - 10000 MHz at mid carrier frequency, iDEN 900



Plot 7.5.24 Spurious emission measurements in 1000 - 10000 MHz at high carrier frequency, iDEN 900

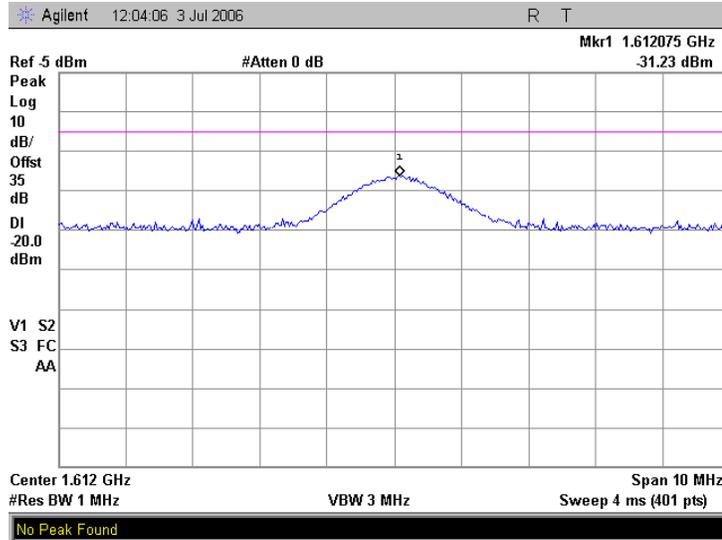




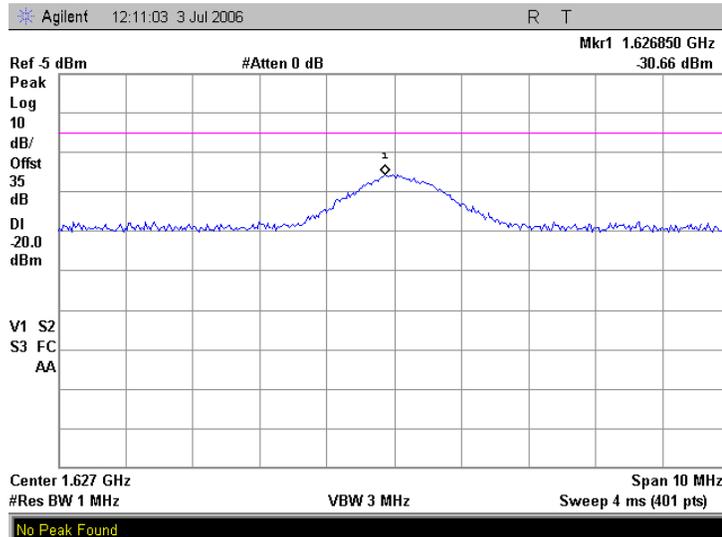
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.25 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of low carrier frequency, iDEN 800



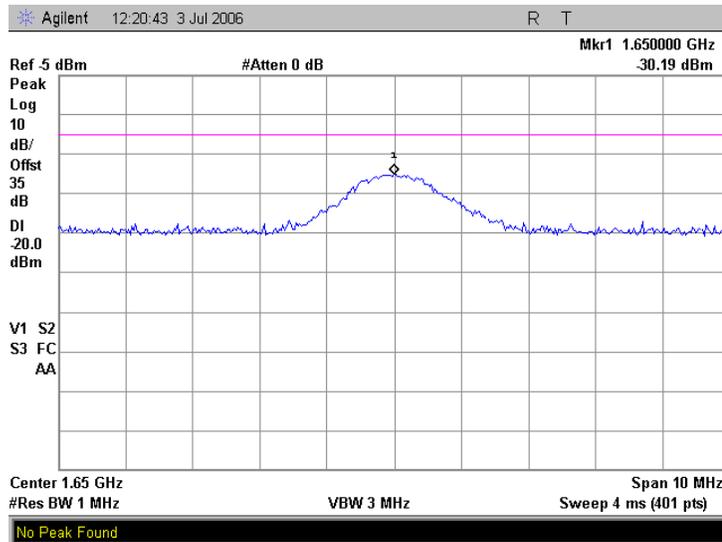
Plot 7.5.26 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of mid carrier frequency, iDEN 800



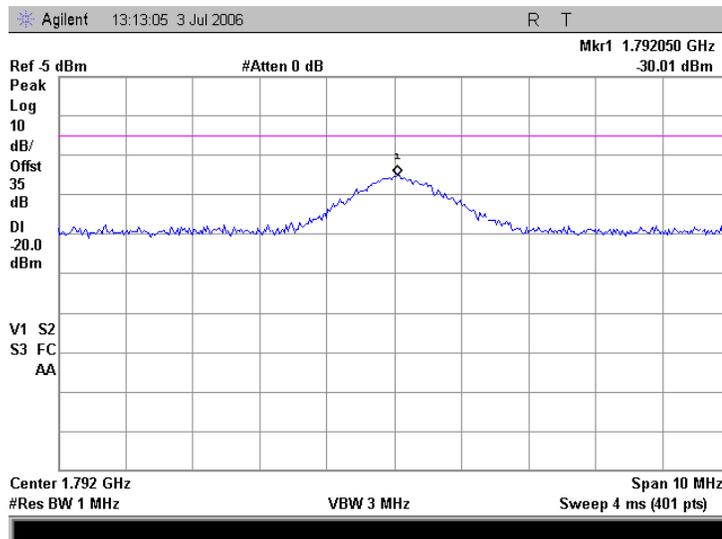


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.27 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of high carrier frequency, iDEN 800



Plot 7.5.28 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of low carrier frequency, iDEN 900

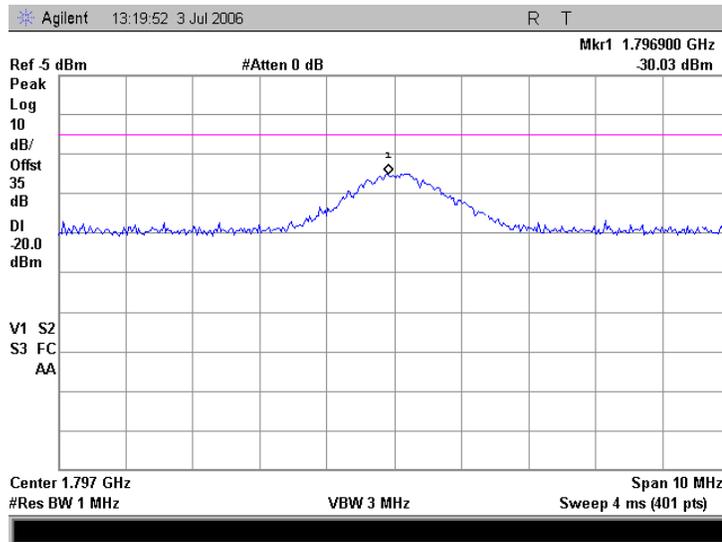




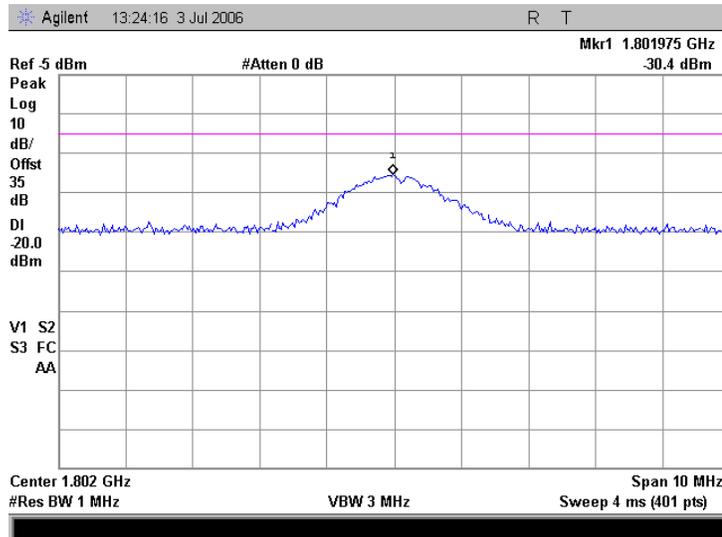
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.29 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of mid carrier frequency, iDEN 900



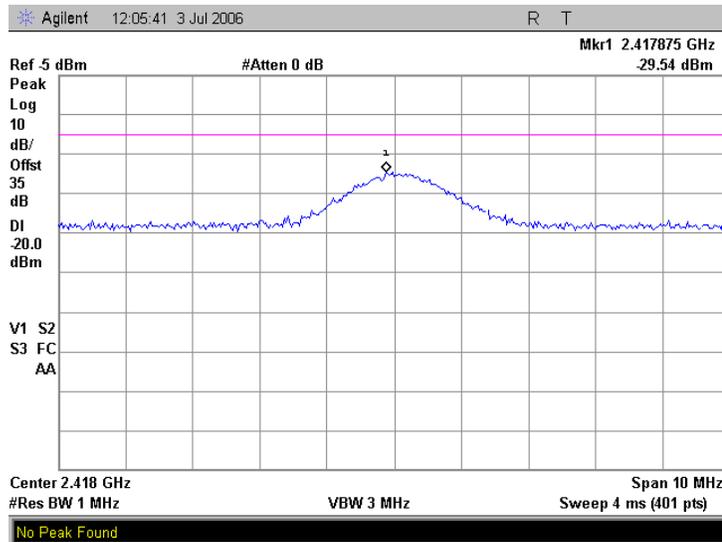
Plot 7.5.30 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of high carrier frequency, iDEN 900



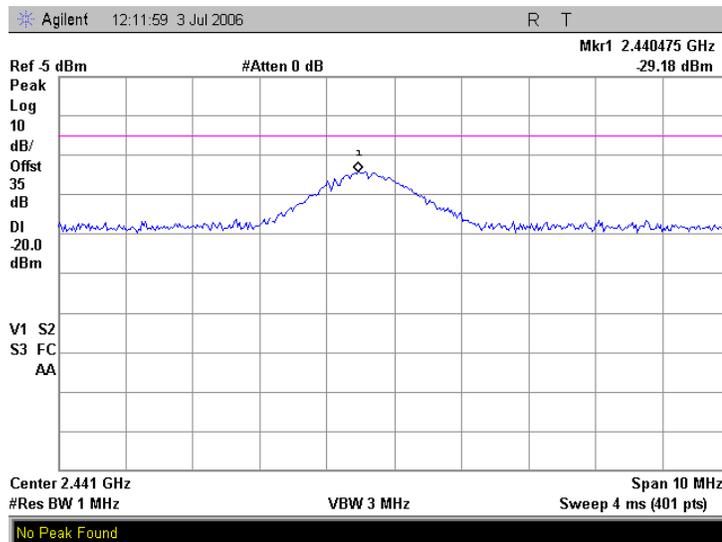


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.31 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of low carrier frequency, iDEN 800



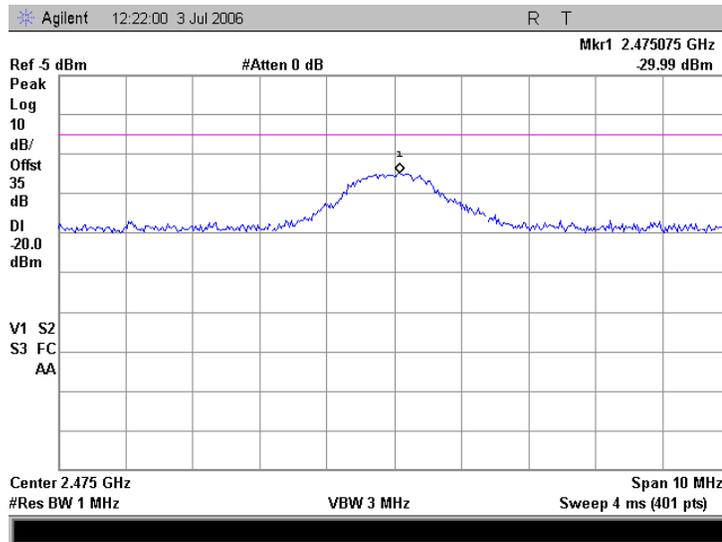
Plot 7.5.32 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of mid carrier frequency, iDEN 800



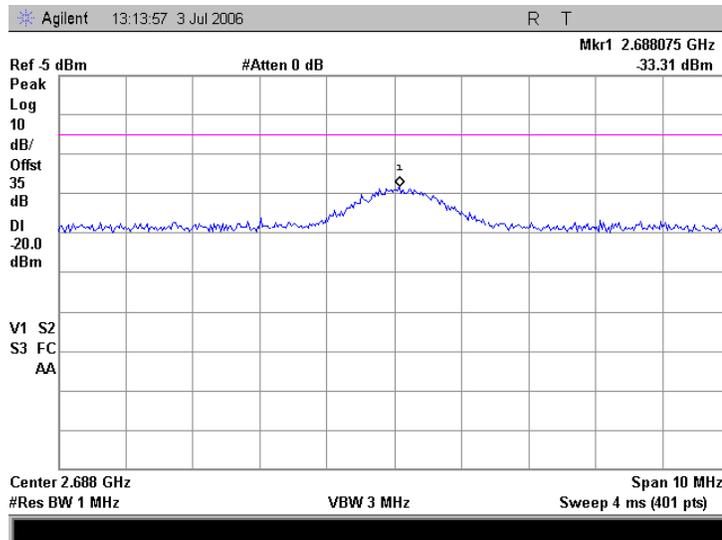


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.33 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of high carrier frequency, iDEN 800



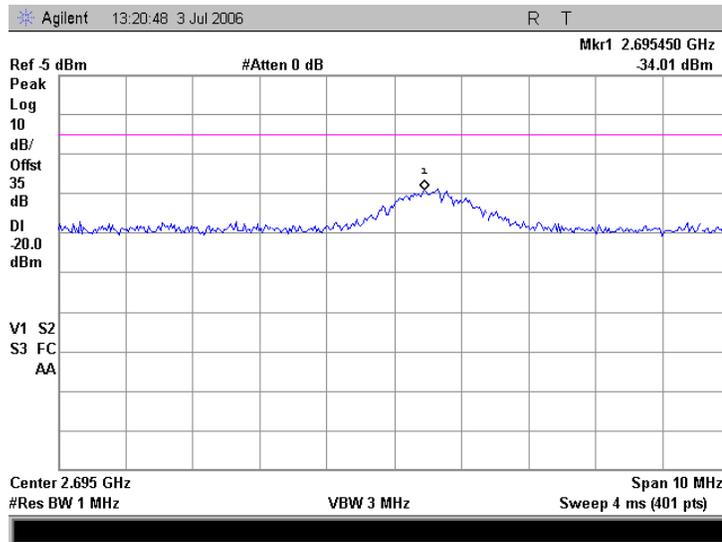
Plot 7.5.34 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of low carrier frequency, iDEN 900



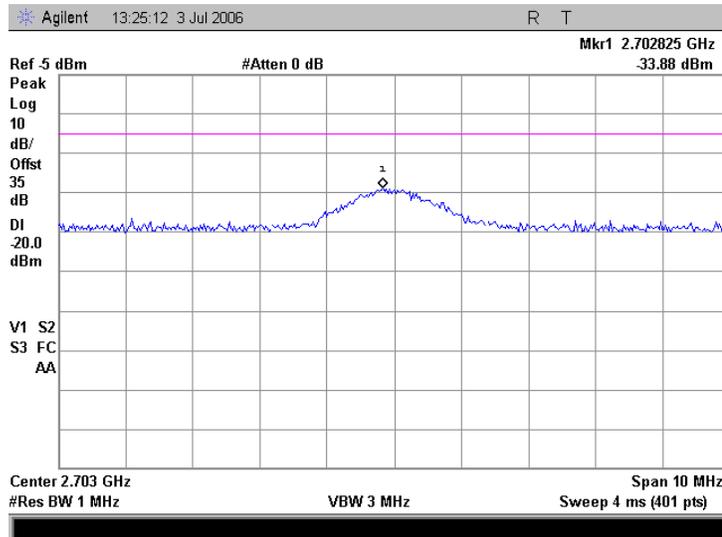


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.35 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of mid carrier frequency, iDEN 900



Plot 7.5.36 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of high carrier frequency, iDEN 900

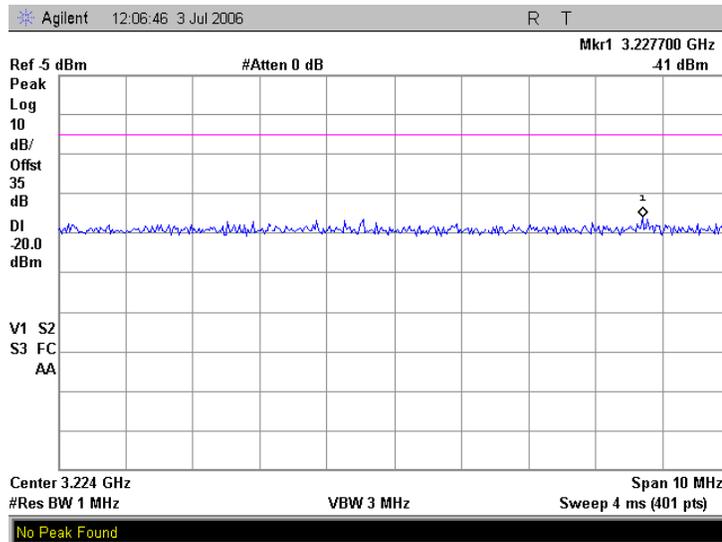




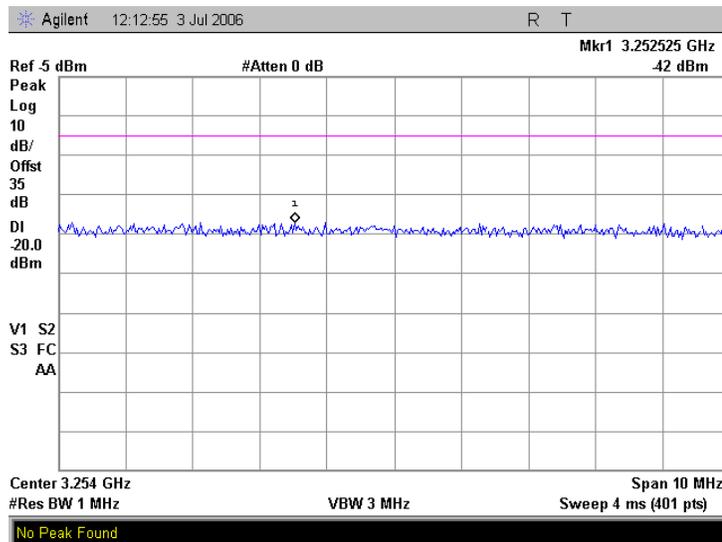
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.37 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of low carrier frequency, iDEN 800



Plot 7.5.38 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of mid carrier frequency, iDEN 800

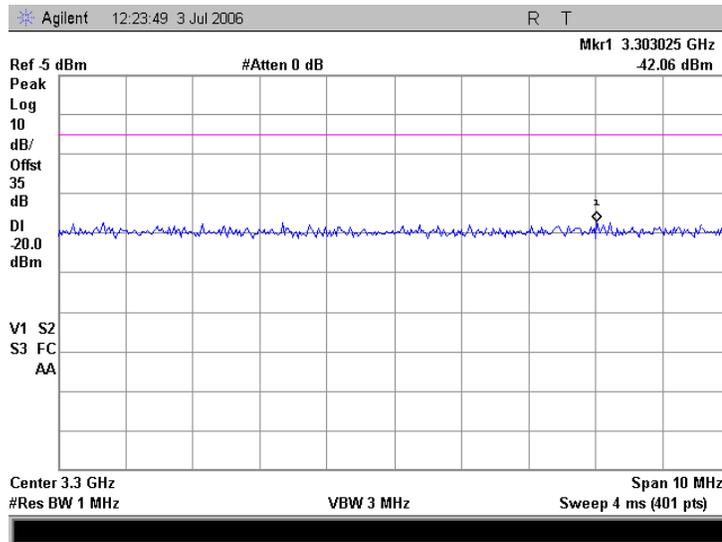




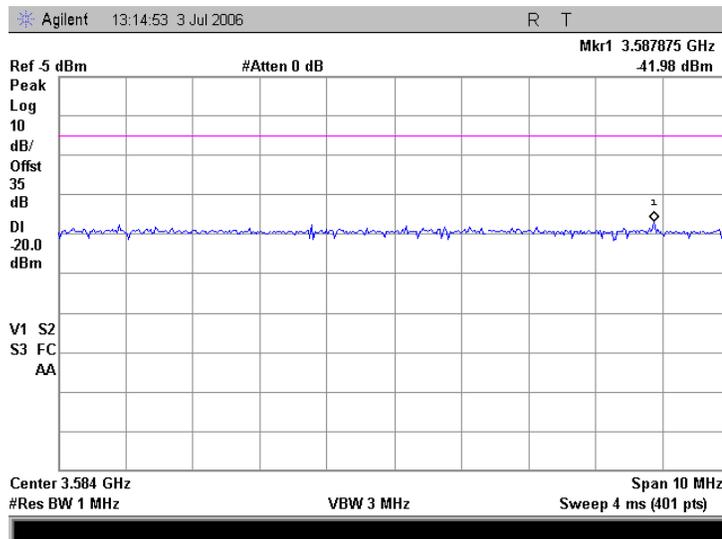
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.39 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of high carrier frequency, iDEN 800



Plot 7.5.40 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of low carrier frequency, iDEN 900

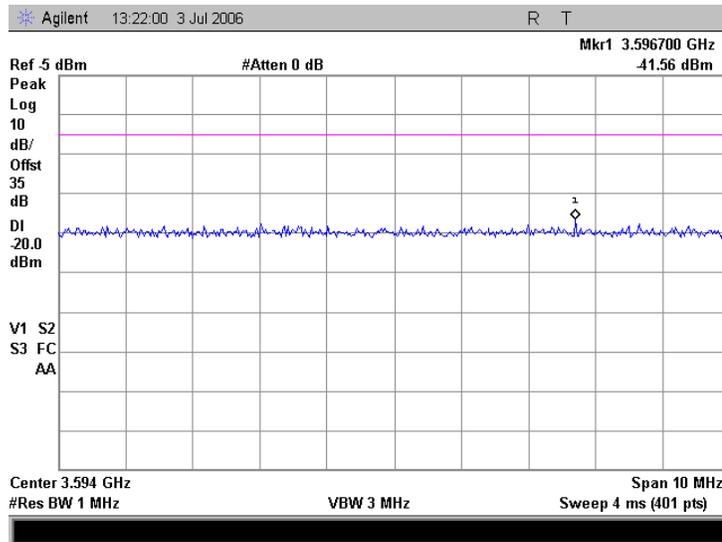




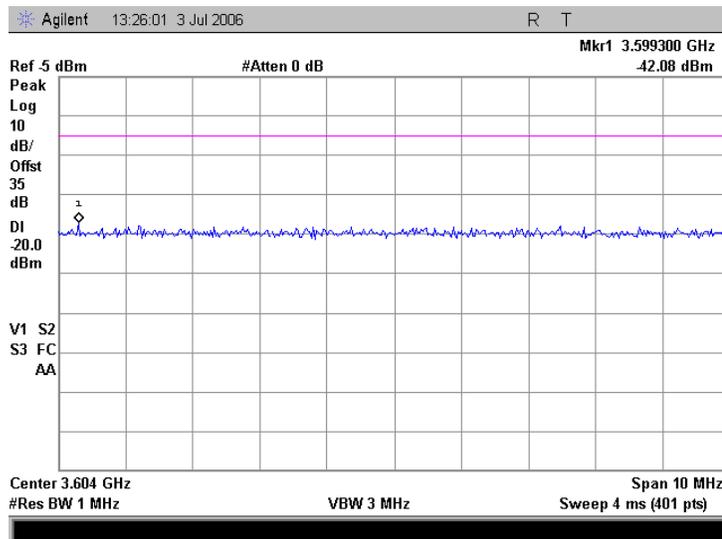
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.41 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of mid carrier frequency, iDEN 900



Plot 7.5.42 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of high carrier frequency, iDEN 900

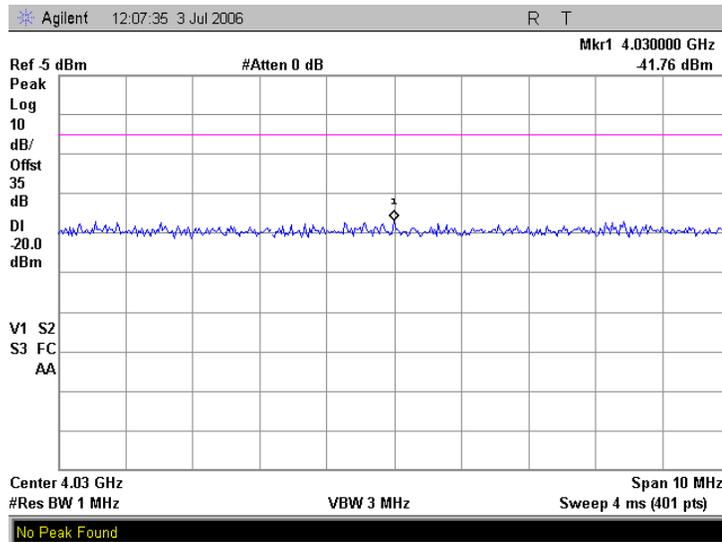




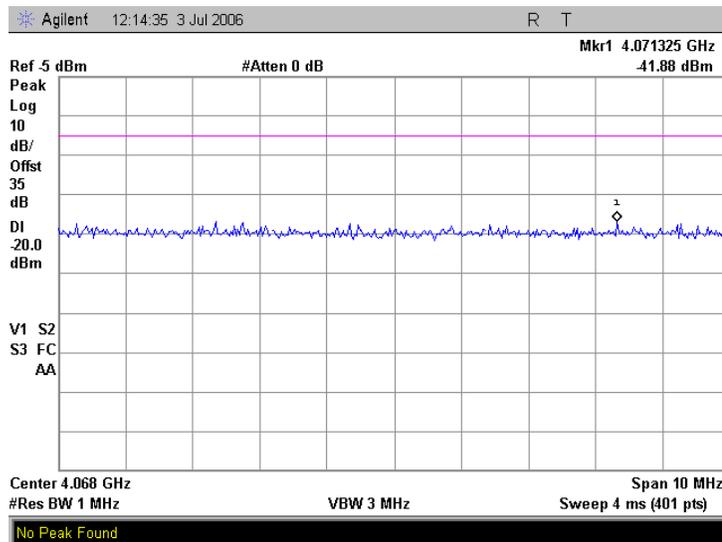
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.43 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of low carrier frequency, iDEN 800



Plot 7.5.44 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of mid carrier frequency, iDEN 800

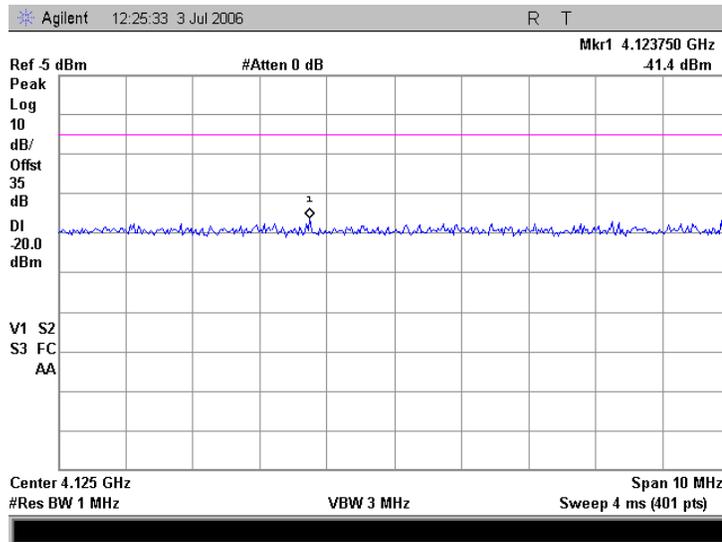




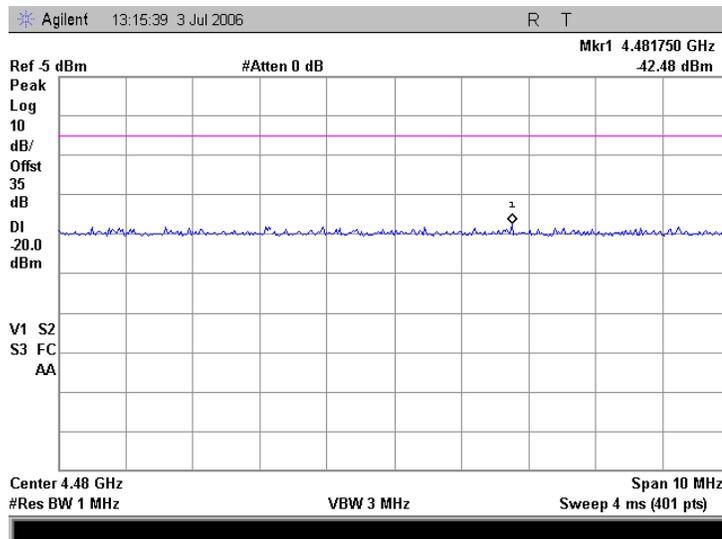
HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.45 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of high carrier frequency, iDEN 800



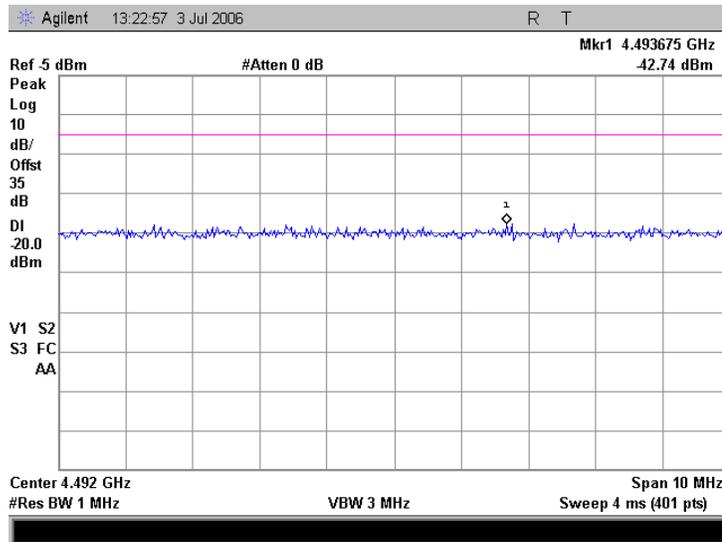
Plot 7.5.46 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of low carrier frequency, iDEN 900



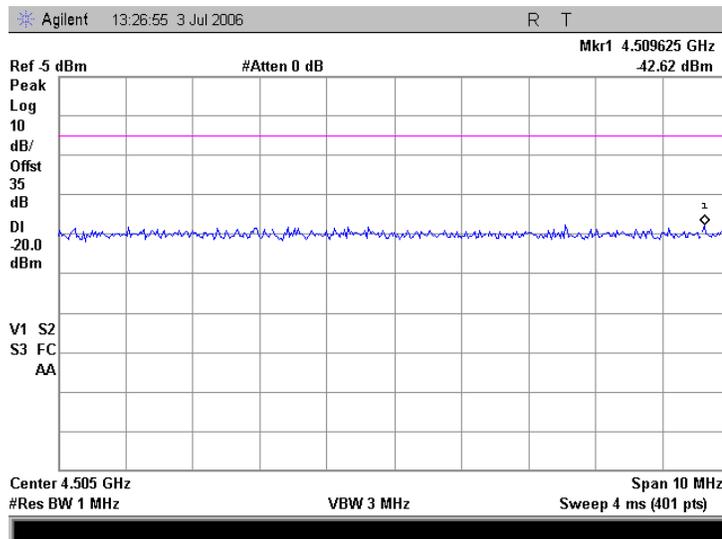


<b>Test specification:</b>	<b>Section 90.210, Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 90.210(m); TIA/EIA-603-A, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/3/2006 2:00:49 PM		
<b>Temperature:</b> 25°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 7.5.47 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of mid carrier frequency, iDEN 900



Plot 7.5.48 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of high carrier frequency, iDEN 900





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<b>Test specification:</b>	<b>Section 90.213, Frequency stability</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1055; TIA/EIA-603-A Section 2.2.2		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	5/17/2006 5:19:29 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1008 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 7.6 Frequency stability test

### 7.6.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.6.1. The test results are provided in Table 7.6.2.

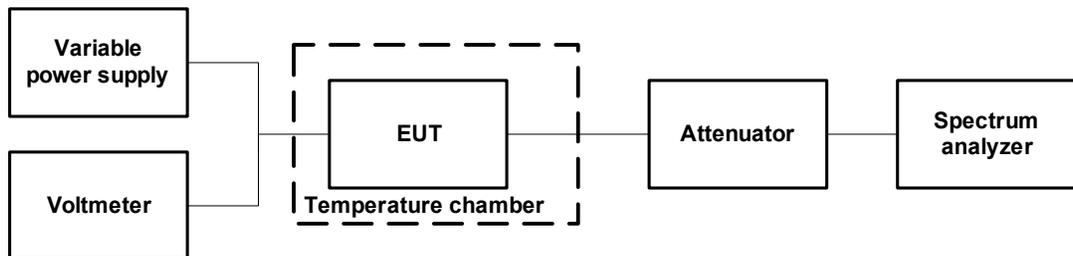
Table 7.6.1 Frequency stability limits

Assigned frequency, MHz	Maximum allowed frequency displacement	
	ppm	Hz
806.0125	1.5	1209
813.5125	2.5	2034
824.9875	2.5	2062
896.01875	1.5	1344
898.51875		1348
900.98125		1351

### 7.6.2 Test procedure

- 7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.
- 7.6.2.2 The EUT power was turned off. Temperature within test chamber was set to +30°C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.
- 7.6.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.
- 7.6.2.4 The above procedure was repeated at 0°C and at the lowest test temperature.
- 7.6.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.
- 7.6.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.6.2.

Figure 7.6.1 Frequency stability test setup





HERMON LABORATORIES

<b>Test specification:</b>		<b>Section 90.213, Frequency stability</b>			
<b>Test procedure:</b>		47 CFR, Section 2.1055; TIA/EIA-603-A Section 2.2.2			
<b>Test mode:</b>		Compliance		<b>Verdict:</b> <b>PASS</b>	
<b>Date &amp; Time:</b>		5/17/2006 5:19:29 PM			
<b>Temperature:</b> 23 °C		<b>Air Pressure:</b> 1008 hPa		<b>Relative Humidity:</b> 49 %	
<b>Remarks:</b>		<b>Power Supply:</b> 12 VDC			

Table 7.6.2 Frequency stability test results

OPERATING FREQUENCY: 806-824 MHz  
 NOMINAL POWER VOLTAGE: 12 V  
 TEMPERATURE STABILIZATION PERIOD: 20 min  
 POWER DURING TEMPERATURE TRANSITION: Off  
 SPECTRUM ANALYZER MODE: Counter  
 RESOLUTION BANDWIDTH: 300 Hz  
 VIDEO BANDWIDTH: 1000 Hz  
 MODULATION: 16QAM

T, °C	Voltage V	Frequency, MHz								Max frequency drift, Hz		Limit, Hz	Margin, Hz	Verdict
		Start up	1 <sup>st</sup> min	2 <sup>nd</sup> min	3 <sup>rd</sup> min	4 <sup>th</sup> min	5 <sup>th</sup> min	10 <sup>th</sup> min	Positive	Negative				
<b>Low frequency 806.0125 MHz</b>														
-30	nominal	806.011906	806.011937	806.011937	806.012000	806.011969	806.011969	806.012063	0	-531	1209	-678	Pass	
-20	nominal	806.012312	NA	NA	NA	NA	NA	806.012188	0	-250		-959	Pass	
-10	nominal	806.012710	NA	NA	NA	NA	NA	806.012630	273	0		-936	Pass	
0	nominal	806.013050	806.013050	806.013025	806.013025	806.013025	806.013025	806.013000	613	0		-596	Pass	
10	nominal	806.012625	NA	NA	NA	NA	NA	806.012625	188	0		-1021	Pass	
20	48	806.012500	NA	NA	NA	NA	NA	806.012594	157	0		-1052	Pass	
20	nominal	806.012500	NA	NA	NA	NA	NA	806.012437*	63	0		-1146	Pass	
20	-15%	806.012437	NA	NA	NA	NA	NA	806.012469	31	0		-1178	Pass	
30	nominal	806.012563	806.012531	806.012531	806.012594	806.012531	806.012531	806.012647	210	0		-999	Pass	
40	nominal	806.012625	NA	NA	NA	NA	NA	806.012563	187	0		-1022	Pass	
50	nominal	806.012531	NA	NA	NA	NA	NA	806.012281	94	-156		-1053	Pass	
<b>Mid frequency 813.5125 MHz</b>														
-30	nominal	813.512031	813.511969	813.512000	813.512031	813.51203	813.512000	813.512000	0	-500	2034	-1534	Pass	
-20	nominal	813.512219	NA	NA	NA	NA	NA	813.512188	0	-281		-1753	Pass	
-10	nominal	813.512630	NA	NA	NA	NA	NA	813.512585	161	0		-1873	Pass	
0	nominal	813.512900	813.512900	813.512925	813.512900	813.512900	813.512875	813.512875	456	0		-1578	Pass	
10	nominal	813.512563	NA	NA	NA	NA	NA	813.512594	125	0		-1909	Pass	
20	48	813.512500	NA	NA	NA	NA	NA	813.512625	156	0		-1878	Pass	
20	nominal	813.512437	NA	NA	NA	NA	NA	813.512469*	0	-31		-2003	Pass	
20	-15%	813.512469	NA	NA	NA	NA	NA	813.512500	31	0		-2003	Pass	
30	nominal	813.512563	813.512594	813.512531	813.512625	813.512594	813.512594	813.512594	157	0		-1877	Pass	
40	nominal	813.512687	NA	NA	NA	NA	NA	813.512594	218	0		-1816	Pass	
50	nominal	813.512219	NA	NA	NA	NA	NA	813.512125	0	-344		-1690	Pass	
<b>High frequency 824.9875 MHz</b>														
-30	nominal	824.986969	824.986969	824.987000	824.987063	824.987000	824.987031	824.987000	0	-531	2062	-1531	Pass	
-20	nominal	824.987156	NA	NA	NA	NA	NA	824.987188	0	-344		-1718	Pass	
-10	nominal	824.987650	NA	NA	NA	NA	NA	824.987585	151	0		-1911	Pass	
0	nominal	824.987850	824.987750	824.987800	824.987825	824.987875	824.987800	824.987775	376	0		-1686	Pass	
10	nominal	824.987594	NA	NA	NA	NA	NA	824.987625	125	0		-1937	Pass	
20	48V	824.987469	NA	NA	NA	NA	NA	824.987531	31	-31		-2031	Pass	
20	nominal	824.987438	NA	NA	NA	NA	NA	824.987500*	0	-62		-2000	Pass	
20	-15%	824.986656	NA	NA	NA	NA	NA	824.987469	0	-843		-1219	Pass	
30	nominal	824.987562	824.987594	824.987625	824.987625	824.987625	824.987625	824.987594	125	0		-1937	Pass	
40	nominal	824.987500	NA	NA	NA	NA	NA	824.987594	94	0		-1968	Pass	
50	nominal	824.987000	NA	NA	NA	NA	NA	824.987063	0	-500		-1562	Pass	

\* - Reference frequency  
 \*\* - Battery operating end point specified by the manufacturer.



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<b>Test specification:</b>	<b>Section 90.213, Frequency stability</b>			
<b>Test procedure:</b>	47 CFR, Section 2.1055; TIA/EIA-603-A Section 2.2.2			
<b>Test mode:</b>	Compliance		<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	5/17/2006 5:19:29 PM			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1008 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply:</b> 12 VDC	
<b>Remarks:</b>				

OPERATING FREQUENCY: 896-902 MHz  
 NOMINAL POWER VOLTAGE: 12 V  
 TEMPERATURE STABILIZATION PERIOD: 20 min  
 POWER DURING TEMPERATURE TRANSITION: Off  
 SPECTRUM ANALYZER MODE: Counter  
 RESOLUTION BANDWIDTH: 300 Hz  
 VIDEO BANDWIDTH: 1000 Hz  
 MODULATION: 16QAM

T, °C	Voltage V	Frequency, MHz							Max frequency drift, Hz		Limit, Hz	Margin, Hz	Verdict
		Start up	1 <sup>st</sup> min	2 <sup>nd</sup> min	3 <sup>rd</sup> min	4 <sup>th</sup> min	5 <sup>th</sup> min	10 <sup>th</sup> min	Positive	Negative			
<b>Low frequency 896.01875 MHz</b>													
-30	nominal	896.018469	896.018531	896.018563	896.018594	896.018594	896.018594	896.018594	0	-250	1344	-1094	Pass
-20	nominal	896.018500	NA	NA	NA	NA	NA	896.018437	0	-281		-1063	Pass
-10	nominal	896.018855	NA	NA	NA	NA	NA	896.018900	182	0		-1162	Pass
0	nominal	896.019060	896.018985	896.019010	896.018985	896.019010	896.019010	896.018885	342	0		-1002	Pass
10	nominal	896.018875	NA	NA	NA	NA	NA	896.018875	156	0		-1188	Pass
20	48	896.018781	NA	NA	NA	NA	NA	896.018781	63	0		-1281	Pass
20	nominal	896.018781	NA	NA	NA	NA	NA	896.018719*	63	0		-1281	Pass
20	-15%	896.018781	NA	NA	NA	NA	NA	896.018781	63	0		-1281	Pass
30	nominal	896.018813	896.018875	896.018844	896.018875	896.018844	896.018844	896.018844	157	0		-1187	Pass
40	nominal	896.018781	NA	NA	NA	NA	NA	896.018781	63	0		-1281	Pass
50	nominal	896.018344	NA	NA	NA	NA	NA	896.018250	0	-469	-875	Pass	
<b>Mid frequency 898.51875 MHz</b>													
-30	nominal	898.518562	898.518562	898.518625	898.518656	898.518625	898.518625	898.518594	0	-188	1348	-1160	Pass
-20	nominal	898.518438	NA	NA	NA	NA	NA	898.518406	0	-344		-1004	Pass
-10	nominal	898.518855	NA	NA	NA	NA	NA	898.518855	106	0		-1242	Pass
0	nominal	898.518960	898.518960	898.518985	898.518935	898.518935	898.518935	898.518835	236	0		-1112	Pass
10	nominal	898.518781	NA	NA	NA	NA	NA	898.518938	188	0		-1160	Pass
20	48	898.518750	NA	NA	NA	NA	NA	898.518750	0	0		-1348	Pass
20	nominal	898.518750	NA	NA	NA	NA	NA	898.518750*	0	0		-1348	Pass
20	-15%	898.518750	NA	NA	NA	NA	NA	898.518750	0	0		-1348	Pass
30	nominal	898.518906	898.518844	898.518875	898.518844	898.518875	898.518875	898.518875	157	0		-1191	Pass
40	nominal	898.518781	NA	NA	NA	NA	NA	898.518813	63	0		-1285	Pass
50	nominal	898.518313	NA	NA	NA	NA	NA	898.518187	0	-563	-785	Pass	
<b>High frequency 900.98125 MHz</b>													
-30	nominal	900.981094	900.981125	900.981063	900.981094	900.981125	900.981062	900.981031	0	-157	1351	-1194	Pass
-20	nominal	900.980719	NA	NA	NA	NA	NA	900.980906	0	-469		-882	Pass
-10	nominal	900.981400	NA	NA	NA	NA	NA	900.981355	212	0		-1139	Pass
0	nominal	900.981360	900.981360	900.981360	900.981410	900.981385	900.981360	900.981360	222	0		-1129	Pass
10	nominal	900.981313	NA	NA	NA	NA	NA	900.981375	187	0		-1164	Pass
20	48	900.981281	NA	NA	NA	NA	NA	900.981288	100	0		-1251	Pass
20	nominal	900.981250	NA	NA	NA	NA	NA	900.981188*	62	0		-1289	Pass
20	-15%	900.981250	NA	NA	NA	NA	NA	900.981341	153	0		-1198	Pass
30	nominal	900.981313	900.981375	900.981375	900.981375	900.981375	900.981406	900.981437	249	0		-1102	Pass
40	nominal	900.981219	NA	NA	NA	NA	NA	900.981375	187	0		-1164	Pass
50	nominal	900.980781	NA	NA	NA	NA	NA	900.980781	0	-407	-944	Pass	

\* - Reference frequency  
 \*\* - Battery operating end point specified by the manufacturer

**Reference numbers of test equipment used**

HL 1508	HL 1653	HL 2368				
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Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 15.247(a)1, (g), (h), Frequency hopping requirements</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 11:57:47 AM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8 Transmitter tests according to 47CFR part 15 subpart C §15.247 (FHSS) requirements

### 8.1 Frequency hopping requirements

The EUT was verified for compliance with frequency hopping requirements listed below:

- The EUT shall hop to channel frequencies that are selected from a pseudorandomly ordered list;
- Each hopping frequency shall be used equally on the average;
- The EUT receiver shall have input bandwidth that match the hopping channel bandwidth of the corresponding transmitter and shall shift frequencies in synchronization with the transmitted signals;
- The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

The rationale for compliance with the above requirements was either test results or supplier declaration. The summary of results is provided in Table 8.1.1.

**Table 8.1.1 Frequency hopping requirements**

Requirement	Rationale	Verdict
The EUT shall hop to channel frequencies that are selected from a pseudorandomly ordered list	Supplier declaration (refer to Table 8.1.2)	Comply
Each hopping frequency shall be used equally on the average	Supplier declaration	Comply
The EUT receiver shall have input bandwidth that match the hopping channel bandwidth of the corresponding transmitter	Supplier declaration	Comply
The EUT receiver shall shift frequencies in synchronization with the transmitted signals	Supplier declaration	Comply
Each transmitter operates independently and there is no synchronization with other transmitters for purposes other than to avoid simultaneous channel occupancy	Supplier declaration	Comply

**Table 8.1.2 Frequency hopping sequence**

Frequency [MHz]	Frequency Assignment						
902.525	F7	912.525	F27	922.525	F47		
903.025	F8	913.025	F28	923.025	F48		
903.525	F9	913.525	F29	923.525	F49		
904.025	F10	914.025	F30	924.025	F50		
904.525	F11	914.525	F31	924.525	F1		
905.025	F12	915.025	F32	925.025	F2		
905.525	F13	915.525	F33	925.525	F3		
906.025	F14	916.025	F34	926.025	F4		
906.525	F15	916.525	F35	926.525	F5		
907.025	F16	917.025	F36	927.025	F6		
907.525	F17	917.525	F37				
908.025	F18	918.025	F38				
908.525	F19	918.525	F39				
909.025	F20	919.025	F40				
909.525	F21	919.525	F41				
910.025	F22	920.025	F42				
910.525	F23	920.525	F43				
911.025	F24	921.025	F44				
911.525	F25	921.525	F45				
912.025	F26	922.025	F46				



<b>Test specification:</b>	<b>Section 15.247(a)1, 20 dB bandwidth</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 12:29:23 PM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8.2 The 20 dB bandwidth

### 8.2.1 General

This test was performed to measure 20 dB bandwidth of the transmitter hopping channel. Specification test limits are given in Table 8.2.1.

Table 8.2.1 The 20 dB bandwidth limits

Assigned frequency, MHz	Maximum bandwidth, kHz	Modulation envelope reference points*, dBc
902.0 – 928.0	500	20
2400.0 – 2483.5	NA	
5725.0 – 5850.0	1000	

\* - Modulation envelope reference points provided in terms of attenuation below the peak of modulated carrier.

### 8.2.2 Test procedure

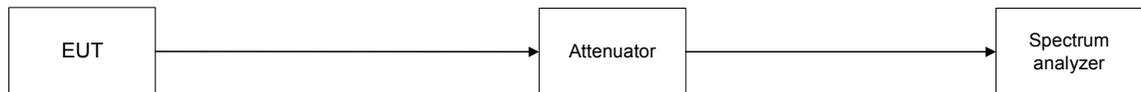
8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and its proper operation was checked.

8.2.2.2 The EUT was set to transmit modulated carrier at maximum data rate.

8.2.2.3 The transmitter bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 8.2.2 and associated plot.

8.2.2.4 The test was repeated for each data rate and each modulation format.

Figure 8.2.1 The 20 dB bandwidth test setup





<b>Test specification:</b> Section 15.247(a)1, 20 dB bandwidth			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/8/2007 12:29:23 PM			
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 8.2.2 The 20 dB bandwidth test results

ASSIGNED FREQUENCY BAND: 902.0 – 928.0 MHz  
DETECTOR USED: Peak  
SWEEP TIME: Auto  
RESOLUTION BANDWIDTH: ≥ 1% of the 20 dB bandwidth  
VIDEO BANDWIDTH: ≥ RBW  
MODULATION ENVELOPE REFERENCE POINTS: 20.0 dBc  
MODULATING SIGNAL: PRBS  
FREQUENCY HOPPING: Disabled

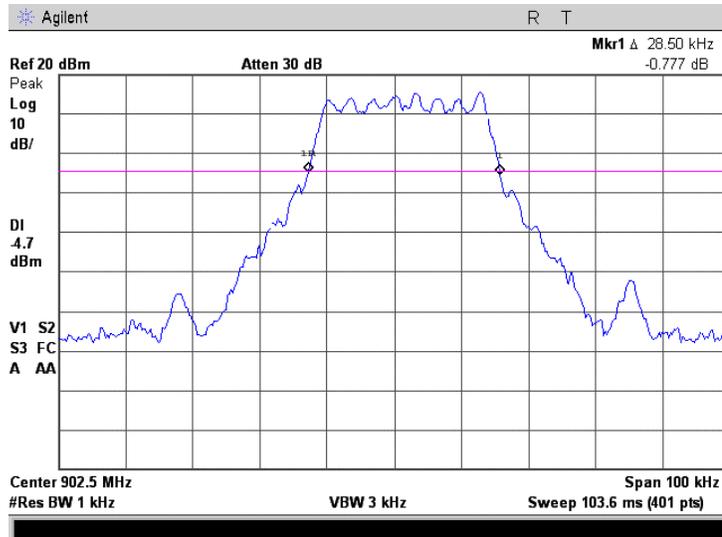
Carrier frequency, MHz	Type of modulation	Data rate, Kbps	Symbol rate, Ksymbols/s	20 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
<b>Low frequency</b>							
902.500	FSK	9.6	3.2	28.50	500	-471.50	Pass
<b>Mid frequency</b>							
915.500	FSK	9.6	3.2	28.75	500	-471.25	Pass
<b>High frequency</b>							
927.500	FSK	9.6	3.2	28.50	500	-471.50	Pass

Reference numbers of test equipment used

HL 0758	HL 0773	HL 2780	HL 2882	HL 3176	HL 3179	HL 3181	
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Full description is given in Appendix A.

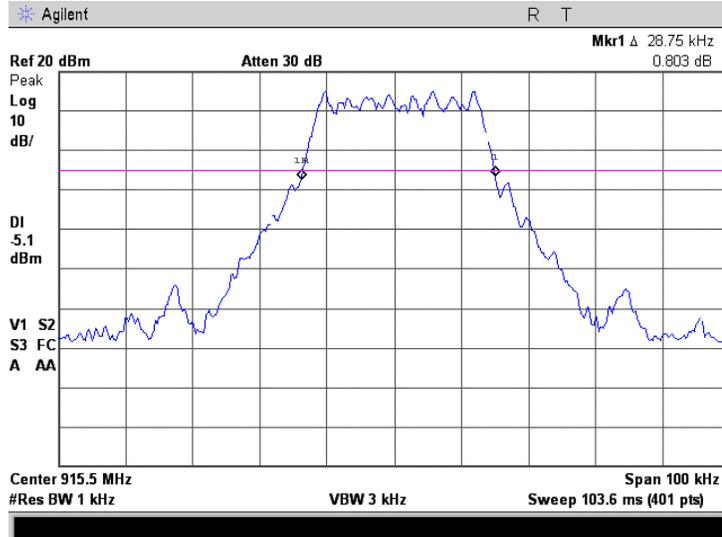
Plot 8.2.1 The 20 dB bandwidth test result at low frequency



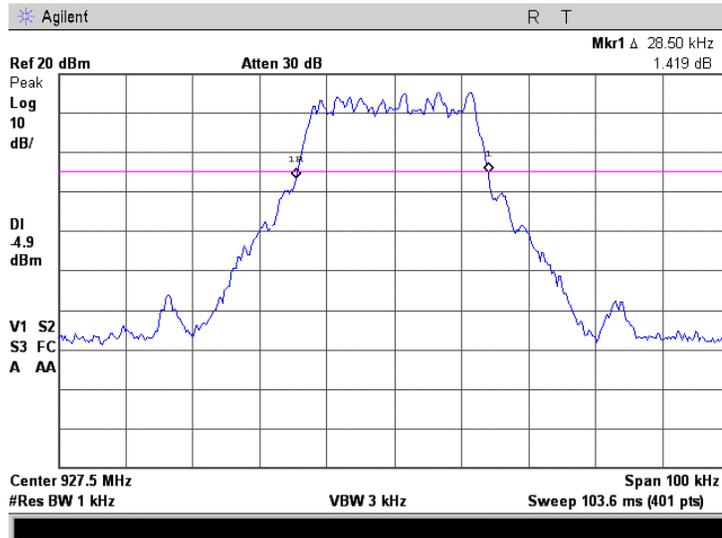


<b>Test specification:</b>	<b>Section 15.247(a)1, 20 dB bandwidth</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 12:29:23 PM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.2.2 The 20 dB bandwidth test result at mid frequency



Plot 8.2.3 The 20 dB bandwidth test result at high frequency





<b>Test specification:</b>	<b>Section 15.247(a)1, Frequency separation</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 1:19:28 PM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

### 8.3 Carrier frequency separation

#### 8.3.1 General

This test was performed to measure frequency separation between the peaks of adjacent channels. Specification test limits are given in Table 8.3.1.

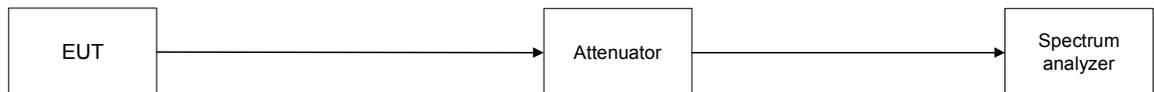
Table 8.3.1 Carrier frequency separation limits

Assigned frequency range, MHz	Carrier frequency separation
902.0 – 928.0	25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater
2400.0 – 2483.5	
5725.0 – 5850.0	

#### 8.3.2 Test procedure

- 8.3.2.1 The EUT was set up as shown in Figure 8.3.1, energized with frequency hopping function enabled and its proper operation was checked.
- 8.3.2.2 The spectrum analyzer span was set to capture the carrier frequency and both of adjacent channels, the lower and the higher. The resolution bandwidth was set wider than 1 % of the frequency span.
- 8.3.2.3 The spectrum analyzer was set in max hold mode and allowed trace to stabilize.
- 8.3.2.4 The frequency separation between the peaks of adjacent channels was measured as provided in Table 8.3.2 and associated plots.

Figure 8.3.1 Carrier frequency separation test setup





<b>Test specification:</b> Section 15.247(a)1, Frequency separation			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/8/2007 1:19:28 PM			
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 8.3.2 Carrier frequency separation test results

ASSIGNED FREQUENCY: 902.0 – 928.0 MHz  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 9.6 kbps  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: ≥ 1% of the span  
 VIDEO BANDWIDTH: ≥ RBW  
 FREQUENCY HOPPING: Enabled  
 20 dB BANDWIDTH: 28.75 kHz

Carrier frequency separation, kHz	Limit, kHz	Margin*	Verdict
50.0	28.75	-21.25	Pass

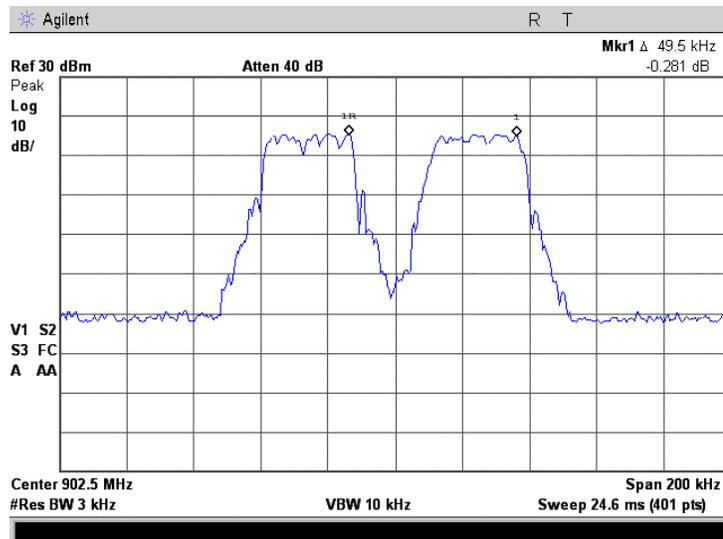
\* - Margin = Carrier frequency separation – specification limit.

Reference numbers of test equipment used

HL 0758	HL 0773	HL 2780	HL 2882	HL 3176	HL 3179	HL 3181	
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Full description is given in Appendix A.

Plot 8.3.1 Carrier frequency separation





<b>Test specification:</b>	<b>Section 15.247(a)1, Number of hopping frequencies</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 1:27:47 PM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8.4 Number of hopping frequencies

### 8.4.1 General

This test was performed to calculate the number of hopping frequencies used by the EUT. Specification test limits are given in Table 8.4.1.

Table 8.4.1 Minimum number of hopping frequencies

Assigned frequency range, MHz	Number of hopping frequencies
902.0 – 928.0	50 (if the 20 dB bandwidth is less than 250 kHz) 25 (if the 20 dB bandwidth is 250 kHz or greater)
2400.0 – 2483.5	15
5725.0 – 5850.0	75

### 8.4.2 Test procedure

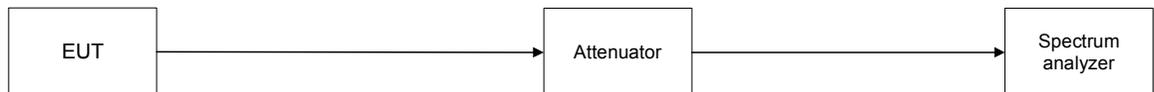
**8.4.2.1** The EUT was set up as shown in Figure 8.4.1, energized with frequency hopping function enabled and its proper operation was checked.

**8.4.2.2** Initially the spectrum analyzer span was set equal to frequency band of operation and the resolution bandwidth was set wider than 1 % of the frequency span. If the separate hopping channels were not clearly resolved the frequency band of operation was broken to sections and the resolution bandwidth was set wider than 1 % of the frequency span of each section.

**8.4.2.3** The spectrum analyzer was set in max hold mode and allowed trace to stabilize.

**8.4.2.4** The number of frequency hopping channels was calculated as provided in Table 8.4.2 and associated plots.

Figure 8.4.1 Hopping frequencies test setup



<b>Test specification:</b>	<b>Section 15.247(a)1, Number of hopping frequencies</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	10/8/2007 1:27:47 PM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 8.4.2 Hopping frequencies test results**

ASSIGNED FREQUENCY: 902.0 – 928.0 MHz  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 9.6 kbps  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: ≥ 1% of the span  
 VIDEO BANDWIDTH: ≥ RBW  
 FREQUENCY HOPPING: Enabled

Number of hopping frequencies	Minimum number of hopping frequencies	Margin*	Verdict
50	50	0	Pass

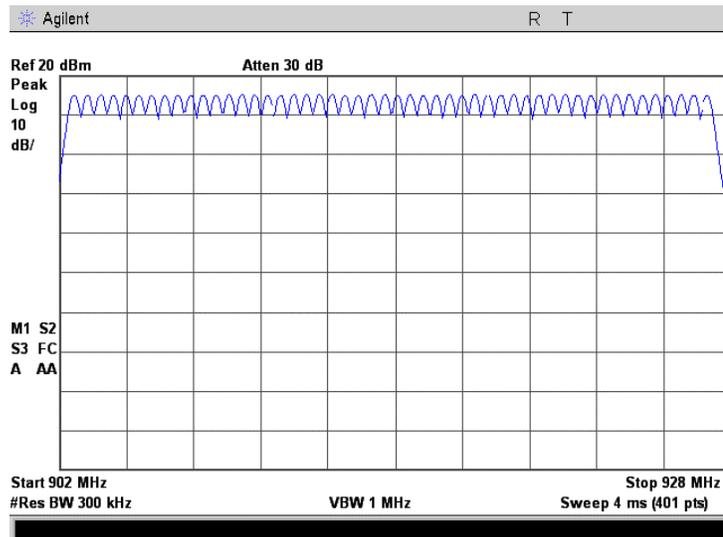
\* - Margin = Number of hopping frequencies – Minimum number of hopping frequencies.

**Reference numbers of test equipment used**

HL 0758	HL 0773	HL 2780	HL 2882	HL 3176	HL 3179	HL 3181	
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Full description is given in Appendix A.

**Plot 8.4.1 Number of hopping frequencies**



<b>Test specification:</b>		<b>Section 15.247(a)1, Average time of occupancy</b>	
<b>Test procedure:</b>		Public notice DA 00-705	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 10:26:33 AM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8.5 Average time of occupancy

### 8.5.1 General

This test was performed to calculate the average time of occupancy (dwell time) on any frequency channel of the EUT. Specification test limits are given in Table 8.5.1.

**Table 8.5.1 Average time of occupancy limits**

Assigned frequency range, MHz	Maximum average time of occupancy, s	Investigated period, s	Number of hopping frequencies
<b>902.0 – 928.0</b>	<b>0.4</b>	<b>20.0</b>	<b>≥ 50</b>
902.0 – 928.0	0.4	10.0	< 50
2400.0 – 2483.5	0.4	0.4 × N	N (≥ 15)
5725.0 – 5850.0	0.4	30.0	≥ 75

### 8.5.2 Test procedure

**8.5.2.1** The EUT was set up as shown in Figure 8.5.1, energized with frequency hopping function enabled and its proper operation was checked.

**8.5.2.2** The spectrum analyzer span was set to zero centered on a hopping channel.

**8.5.2.3** The single transmission duration and period were measured with oscilloscope.

**8.5.2.4** The average time of occupancy was calculated as the single transmission time multiplied by the investigated period and divided by the single transmission period.

**8.5.2.5** The test was repeated at each data rate and modulation type as provided in Table 8.5.2 and associated plots.

**Figure 8.5.1 Average time of occupancy test setup**





<b>Test specification:</b>		<b>Section 15.247(a)1, Average time of occupancy</b>	
<b>Test procedure:</b>		Public notice DA 00-705	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 10:26:33 AM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 8.5.2 Average time of occupancy test results**

ASSIGNED FREQUENCY: 902.0 – 928.0 MHz  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 DETECTOR USED: Peak  
 NUMBER OF HOPPING FREQUENCIES: 50  
 INVESTIGATED PERIOD: 20 s  
 FREQUENCY HOPPING: Enabled

Carrier frequency, MHz	Single transmission duration, s	Single transmission period, s	Average time of occupancy*	Bit rate, kbps	Symbol rate, ksymbol/s	Limit, s	Margin, s**	Verdict
915.525	0.085	0.090	0.378	9.6	3.2	0.4	-0.022	Pass

\* - Average time of occupancy = (Single transmission duration × Investigated period) / (Single transmission period × number of hopping channels).

\*\* - Margin = Average time of occupancy – specification limit.

**Reference numbers of test equipment used**

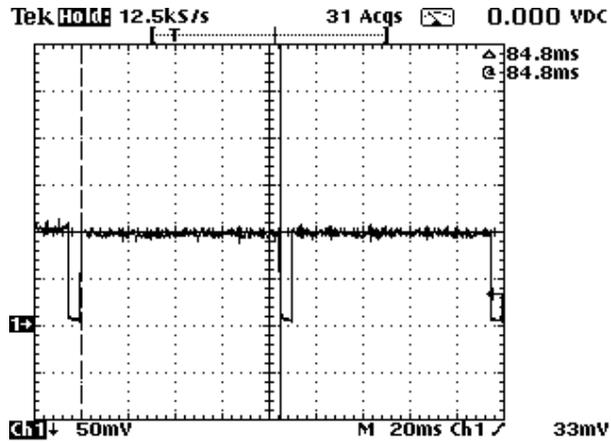
HL 0337	HL 0773	HL 1513	HL 1562	HL 2483	HL 2780	HL 3179	
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Full description is given in Appendix A.

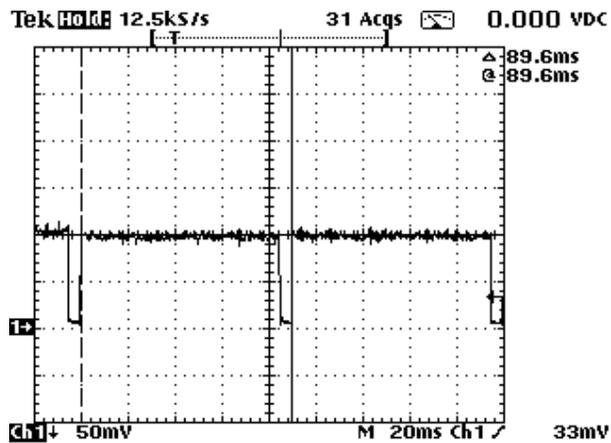


<b>Test specification:</b>	<b>Section 15.247(a)1, Average time of occupancy</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 10:26:33 AM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.5.1 Single transmission duration



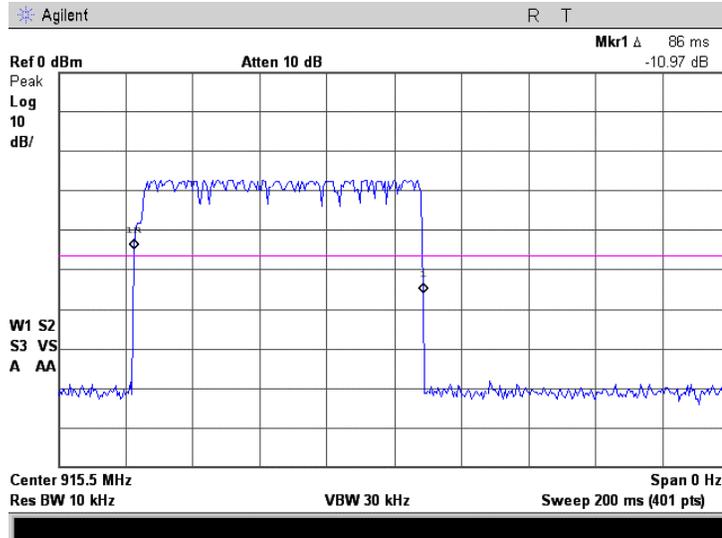
Plot 8.5.2 Single transmission period





<b>Test specification:</b>	<b>Section 15.247(a)1, Average time of occupancy</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/8/2007 10:26:33 AM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.5.3 Single transmission duration





<b>Test specification:</b> Section 15.247(b), Peak output power	
<b>Test procedure:</b> Public notice DA 00-705	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b> 10/15/2007 8:30:02 PM	
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa
<b>Relative Humidity:</b> 45 %	
<b>Power Supply:</b> 12 VDC	
<b>Remarks:</b>	

## 8.6 Peak output power

### 8.6.1 General

This test was performed to measure the maximum peak output power at the transmitter RF antenna connector. Specification test limits are given in Table 8.6.1.

Table 8.6.1 Peak output power limits

Assigned frequency range, MHz	Peak output power*		Maximum antenna gain, dBi
	W	dBm	
902.0 – 928.0	1.0	30.0	6.0*

\*- If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated value as follows:

- by 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point-to-point transmitters operate in 2400-2483.5 MHz band;
- without any corresponding reduction for fixed point-to-point transmitters operate in 5725-5850 MHz band;
- by the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

### 8.6.2 Test procedure

8.6.2.1 The EUT was set up as shown in Figure 8.6.1, energized and its proper operation was checked.

8.6.2.2 The EUT was adjusted to produce maximum available for end user RF output power.

8.6.2.3 The frequency span of spectrum analyzer was set approximately 5 times wider than 20 dB bandwidth of the EUT and the resolution bandwidth was set wider than 20 dB bandwidth of the EUT. The spectrum analyzer trace was allowed to stabilize and the maximum peak output power was measured as provided in Table 8.6.2 and associated plots.

Figure 8.6.1 Peak output power test setup





<b>Test specification:</b>	<b>Section 15.247(b), Peak output power</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:30:02 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 8.6.2 Peak output power test results

ASSIGNED FREQUENCY BAND: 902 – 928 MHz  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 9.6 kbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 EUT 20 dB BANDWIDTH: MHz  
 RESOLUTION BANDWIDTH: 1 MHz  
 VIDEO BANDWIDTH: 3 MHz  
 FREQUENCY HOPPING: Disabled

Carrier frequency MHz	Spectrum analyzer reading, dBm	External attenuation dB	Cable loss dB	Peak output power, dBm	Limit, dBm	Margin*, dB	Verdict
902.495	25.05	Including	Including	25.05	30.0	-4.95	Pass
915.450	25.02	Including	Including	25.02	30.0	-4.98	Pass
927.425	24.99	Including	Including	24.99	30.0	-5.01	Pass

\* - Margin = Peak output power – specification limit.

**Reference numbers of test equipment used**

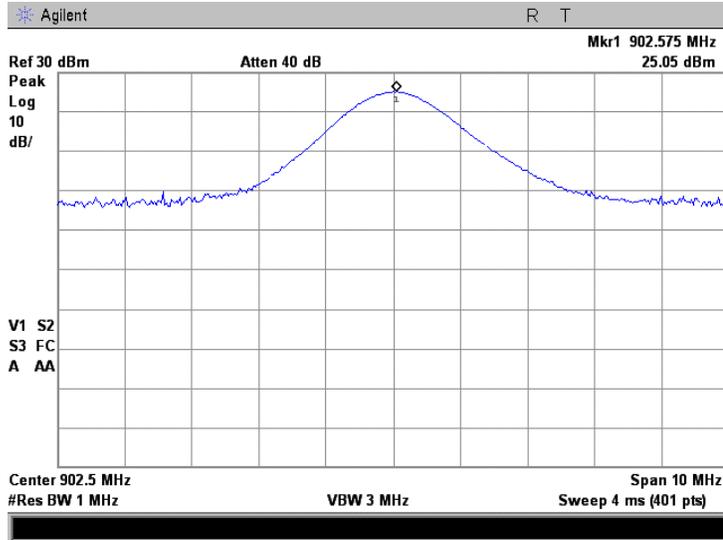
HL 0758	HL 2780	HL 2882	HL 3176	HL 3179	HL 3181		
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Full description is given in Appendix A.

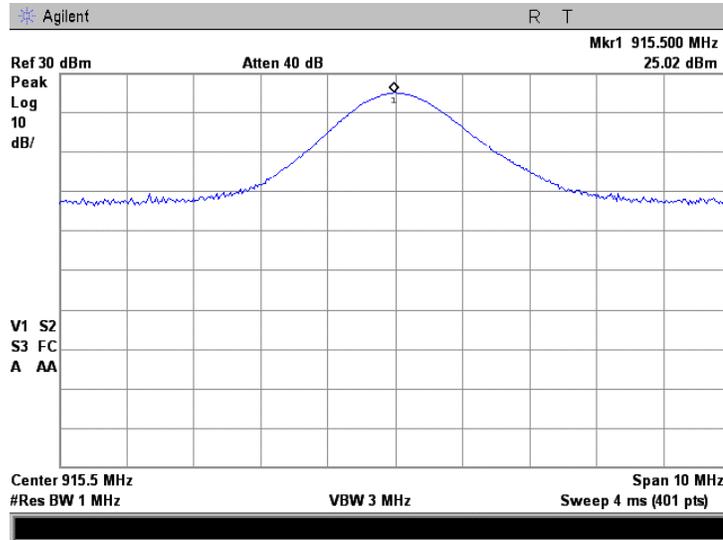


<b>Test specification:</b>	<b>Section 15.247(b), Peak output power</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:30:02 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.6.1 Peak output power at low frequency



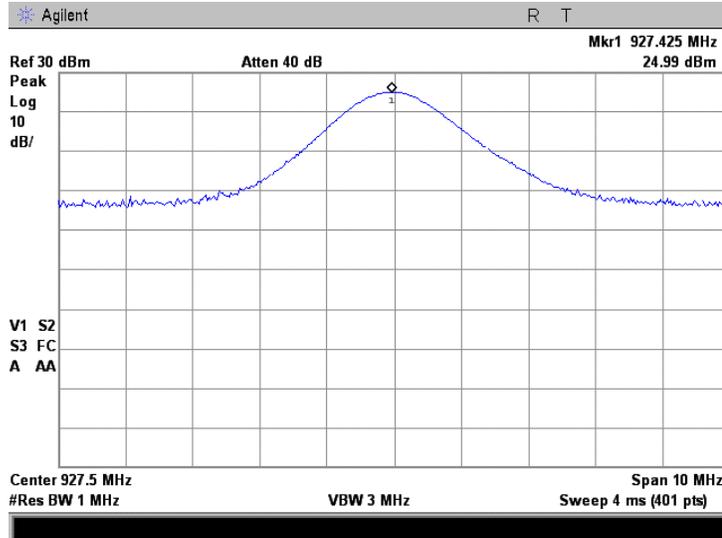
Plot 8.6.2 Peak output power at mid frequency





<b>Test specification:</b>	<b>Section 15.247(b), Peak output power</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:30:02 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.6.3 Peak output power at high frequency





<b>Test specification:</b>	<b>Section 15.247(c), Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:31:22 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8.7 Band edge emissions at RF antenna connector

### 8.7.1 General

This test was performed to measure band edge emissions at RF antenna connector. Specification test limits are given in Table 8.7.1.

Table 8.7.1 Band edge emission limits

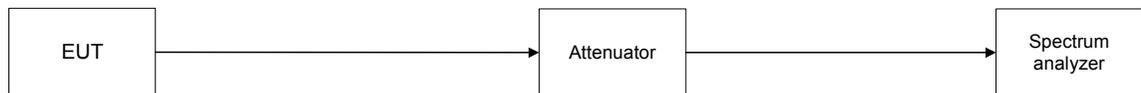
Assigned frequency, MHz	Attenuation below carrier*, dBc
902.0 – 928.0	20.0
2400.0 – 2483.5	
5725.0 – 5850.0	

\* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

### 8.7.2 Test procedure

- 8.7.2.1 The EUT was set up as shown in Figure 8.7.1, energized normally modulated at the maximum data rate with its hopping function disabled and its proper operation was checked.
- 8.7.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.
- 8.7.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.
- 8.7.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.
- 8.7.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 8.7.2 and associated plots and referenced to the highest emission level measured within the authorized band.
- 8.7.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.
- 8.7.2.7 The above procedure was repeated with the frequency hopping function enabled.

Figure 8.7.1 Band edge emission test setup





<b>Test specification:</b>	<b>Section 15.247(c), Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:31:22 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 8.7.2 Band edge emission test results**

ASSIGNED FREQUENCY RANGE: 902.0 – 928.0 MHz  
DETECTOR USED: Peak  
MODULATION: FSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 9.6 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
RESOLUTION BANDWIDTH:  $\geq 1\%$  of the span  
VIDEO BANDWIDTH:  $\geq$  RBW

Frequency, MHz	Band edge emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
<b>Frequency hopping disabled</b>						
901.5100	-52.39	25.33	77.72	20.0	57.72	Pass
928.0275	-52.59	25.56	78.15		58.15	
<b>Frequency hopping enabled</b>						
901.5500	-46.99	25.33	72.32	20.0	52.32	Pass
928.0275	-50.28	25.56	75.84		55.84	

\*- Margin = Attenuation below carrier – specification limit.

**Reference numbers of test equipment used**

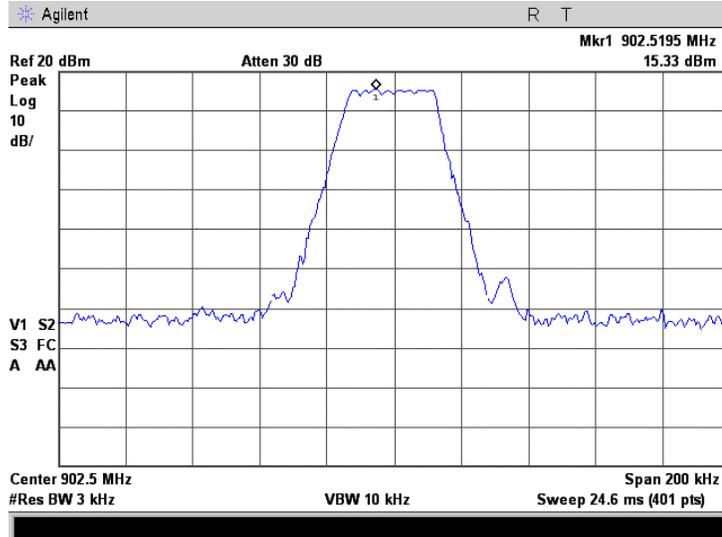
HL 0758	HL 0773	HL 2780	HL 2882	HL 3176	HL 3179	HL 3181	
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Full description is given in Appendix A.



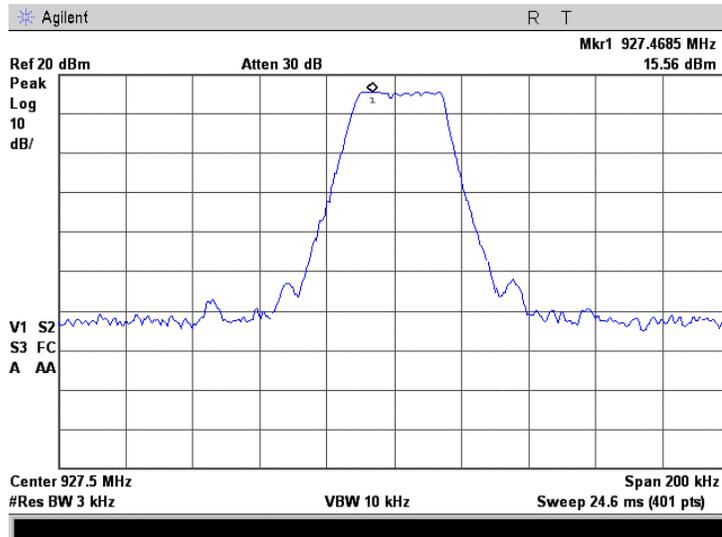
<b>Test specification:</b>	<b>Section 15.247(c), Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:31:22 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.7.1 The highest emission level within the assigned band at low carrier frequency



Note: external attenuation of 10 dB was used  
Emission level: 15.33 dBm +10 dB = 25.33 dBm

Plot 8.7.2 The highest emission level within the assigned band at high carrier frequency

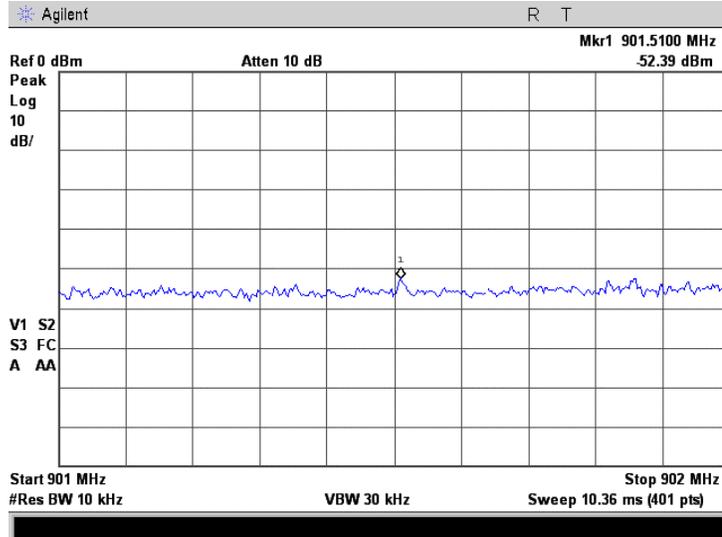


Note: external attenuation of 10 dB was used  
Emission level: 15.56 dBm +10 dB = 25.56 dBm

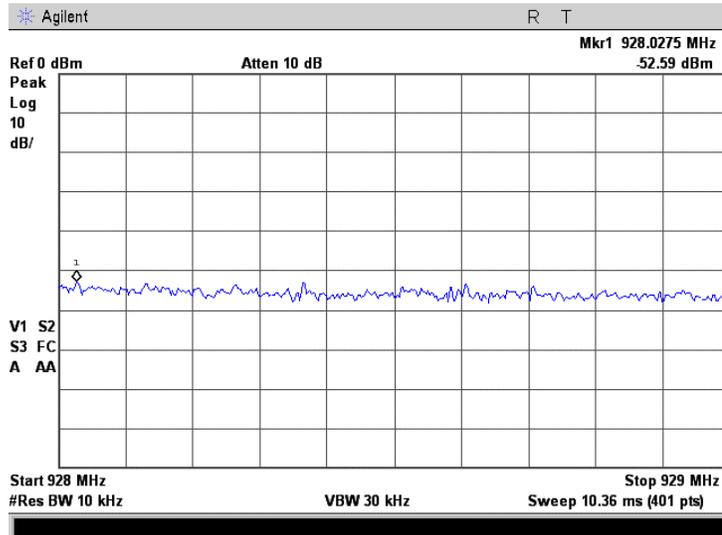


<b>Test specification:</b>	<b>Section 15.247(c), Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:31:22 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.7.3 The highest band edge emission at low carrier frequency with hopping function disabled



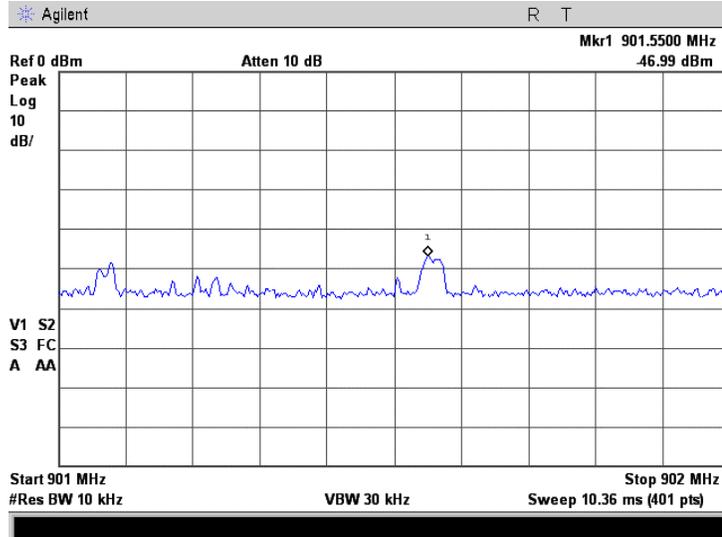
Plot 8.7.4 The highest band edge emission at high carrier frequency with hopping function disabled



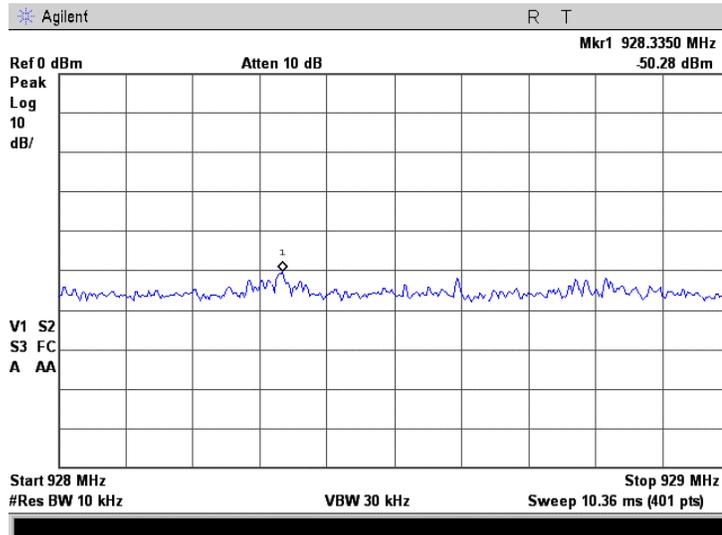


<b>Test specification:</b>	<b>Section 15.247(c), Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/15/2007 8:31:22 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 45 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.7.5 The highest band edge emission at low carrier frequency with hopping function enabled



Plot 8.7.6 The highest band edge emission at high carrier frequency with hopping function enabled





<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8.8 Field strength of spurious emissions

### 8.8.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 8.8.1.

Table 8.8.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB( $\mu$ V/m) <sup>***</sup>			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc <sup>***</sup>
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5 <sup>**</sup>	20.0
0.090 – 0.110	NA	108.5 – 106.8 <sup>**</sup>	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8 <sup>**</sup>	
0.490 – 1.705	NA	73.8 – 63.0 <sup>**</sup>	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 – 1000		54.0		
1000 – 10 <sup>th</sup> harmonic	74.0	NA	54.0	

\*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:  

$$\text{Lim}_{S_2} = \text{Lim}_{S_1} + 40 \log(S_1/S_2),$$

where  $S_1$  and  $S_2$  – standard defined and test distance respectively in meters.

\*\* - The limit decreases linearly with the logarithm of frequency.

\*\*\* - The field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

### 8.8.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

8.8.2.1 The EUT was set up as shown in Figure 8.8.1, energized and the performance check was conducted.

8.8.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

8.8.2.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

### 8.8.3 Test procedure for spurious emission field strength measurements above 30 MHz

8.8.3.1 The EUT was set up as shown in Figure 8.8.2, energized and the performance check was conducted.

8.8.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

8.8.3.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

<b>Test specification:</b> Section 15.247(c), Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b> 10/17/2007 7:02:18 PM			
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Figure 8.8.1 Setup for spurious emission field strength measurements below 30 MHz

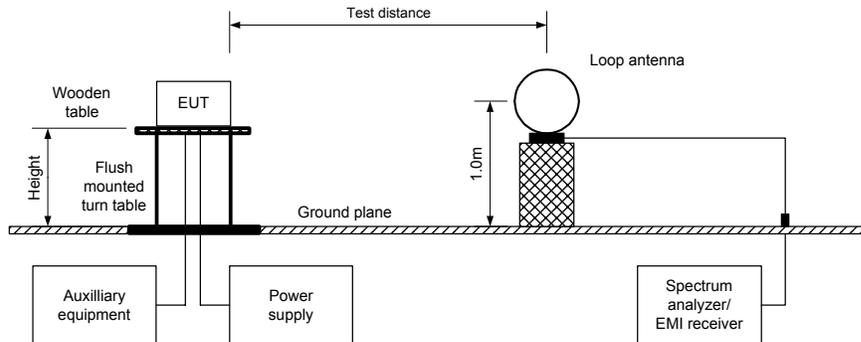
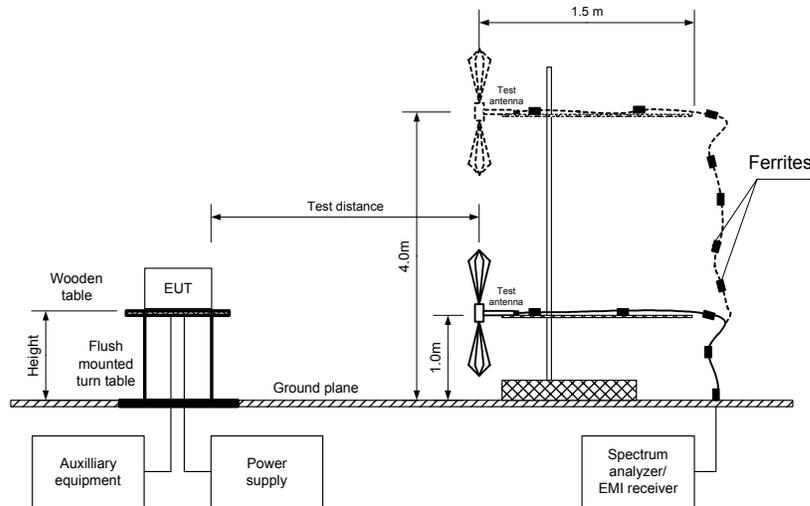


Figure 8.8.2 Setup for spurious emission field strength measurements above 30 MHz





<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 8.8.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY:	902.0 – 928.0 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 9500 MHz
TEST DISTANCE:	3 m
MODULATION:	FSK
MODULATING SIGNAL:	PRBS
BIT RATE:	9.6 kbps
DUTY CYCLE:	95 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	300 kHz
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
FREQUENCY HOPPING:	Disabled

Frequency MHz	Field strength of spurious, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	Field strength of carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Verdict
<b>Low carrier frequency</b>								
All found emissions were at least 20 dB below the limit					125.1	>20	20.0	Pass
<b>Mid carrier frequency</b>								
All found emissions were at least 20 dB below the limit					125.2	>20	20.0	Pass
<b>High carrier frequency</b>								
All found emissions were at least 20 dB below the limit					124.7	>20	20.0	Pass

\*- EUT front panel refers to 0 degrees position of turntable.

\*\*- Margin = Attenuation below carrier – specification limit.



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 8.8.3 Field strength of spurious emissions above 1 GHz within restricted bands**

ASSIGNED FREQUENCY: 902.0 – 928.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 1000 - 9500 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 9.6 kbps  
 DUTY CYCLE: 95 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1000 kHz  
 TEST ANTENNA TYPE: Double ridged guide  
 FREQUENCY HOPPING: Disabled

Frequency MHz	Antenna		Azimuth degrees	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)				Verdict
	Polarization	Height m		Measured dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured dB(μV/m)	Calculated dB(μV/m)	Limit, dB(μV/m)	Margin dB***	
<b>Low carrier frequency</b>											
All found emissions were at least 20 dB below the limit											Pass
<b>Mid carrier frequency</b>											
All found emissions were at least 20 dB below the limit											Pass
<b>High carrier frequency</b>											
All found emissions were at least 20 dB below the limit											Pass

\*- EUT front panel refers to 0 degrees position of turntable.  
 \*\*- Margin = Measured field strength - specification limit.  
 \*\*\*- Margin = Calculated field strength - specification limit,  
 where Calculated field strength = Measured field strength + average factor.

**Table 8.8.4 Average factor calculation**

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
84.75	90.00	-	-	-	-0.52

\*- Average factor was calculated as follows  
 for pulse train shorter than 100 ms:  $Average\ factor = 20 \times \log_{10} \left( \frac{Pulse\ duration}{Pulse\ period} \times \frac{Burst\ duration}{Train\ duration} \times Number\ of\ bursts\ within\ pulse\ train \right)$   
 for pulse train longer than 100 ms:  $Average\ factor = 20 \times \log_{10} \left( \frac{Pulse\ duration}{Pulse\ period} \times \frac{Burst\ duration}{100\ ms} \times Number\ of\ bursts\ within\ 100\ ms \right)$



<b>Test specification:</b>		<b>Section 15.247(c), Radiated spurious emissions</b>	
<b>Test procedure:</b>		Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Table 8.8.5 Field strength of spurious emissions below 1 GHz within restricted bands**

ASSIGNED FREQUENCY: 902.0 – 928.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 9.6 kbps  
 DUTY CYCLE: 95 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)  
 9.0 kHz (150 kHz – 30 MHz)  
 120 kHz (30 MHz – 1000 MHz)  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)  
 FREQUENCY HOPPING: Disabled

Frequency MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB'				
<b>Mid carrier frequency</b>								
122.07	44.9	36.9	43.50	-6.6	H	1.61	199	Pass
172.064	40.2	37.9	43.50	-5.6	H	1.84	225	

\*- Margin = Measured emission - specification limit.  
 \*\*- EUT front panel refer to 0 degrees position of turntable.

**Table 8.8.6 Restricted bands**

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 - 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 - 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

**Reference numbers of test equipment used**

HL 0032	HL 0415	HL 0566	HL 0812	HL 1425	HL 1430	HL 1553	HL 1566
HL 2259	HL 2697	HL 2871	HL 2909				

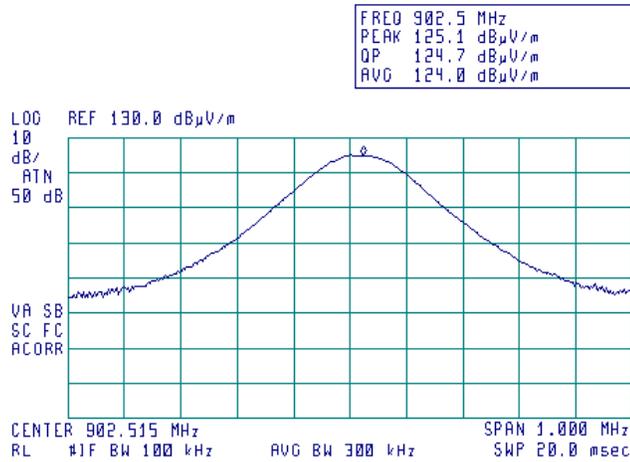
Full description is given in Appendix A.



<b>Test specification:</b> Section 15.247(c), Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/17/2007 7:02:18 PM			
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

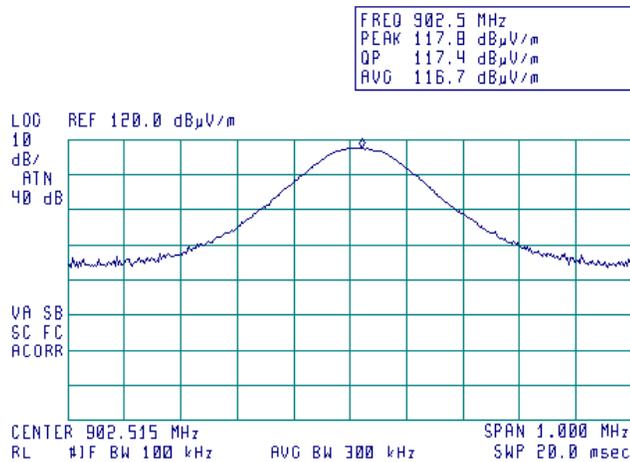
Plot 8.8.1 Radiated emission measurements at the low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



Plot 8.8.2 Radiated emission measurements at the low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Horizontal 1.

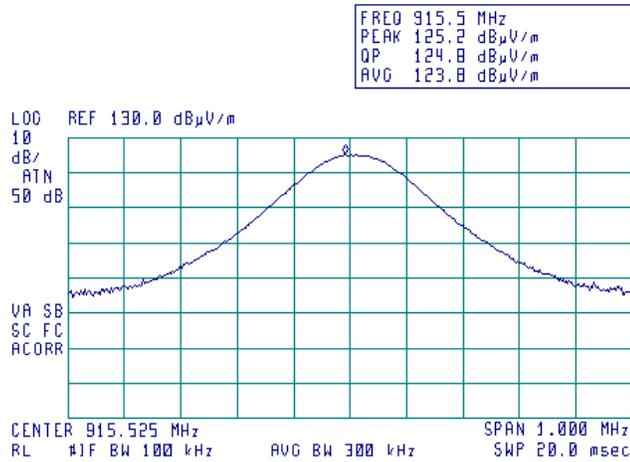




<b>Test specification:</b> Section 15.247(c), Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/17/2007 7:02:18 PM			
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

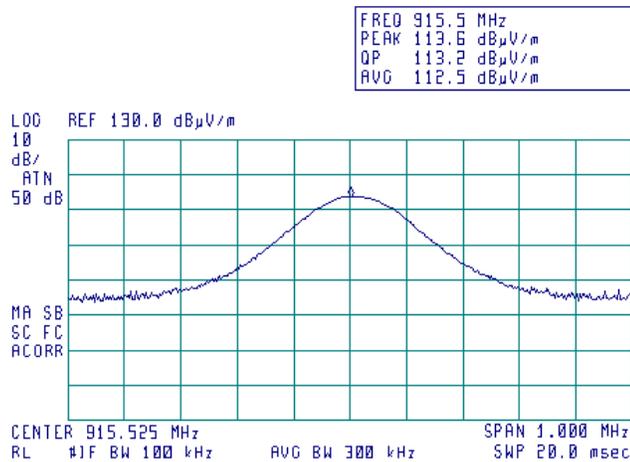
**Plot 8.8.3 Radiated emission measurements at the mid carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



**Plot 8.8.4 Radiated emission measurements at the mid carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Horizontal

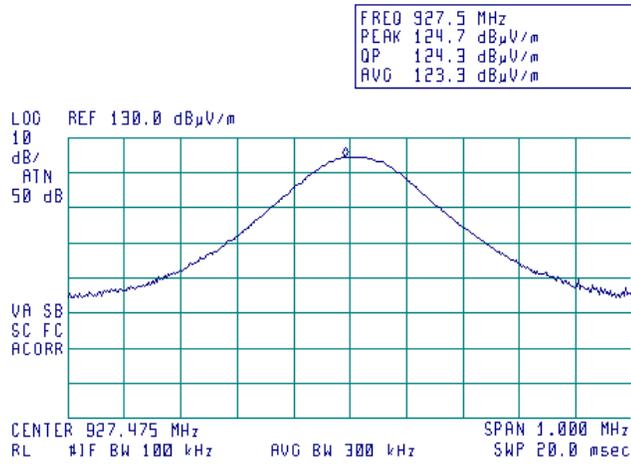




<b>Test specification:</b> Section 15.247(c), Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/17/2007 7:02:18 PM			
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

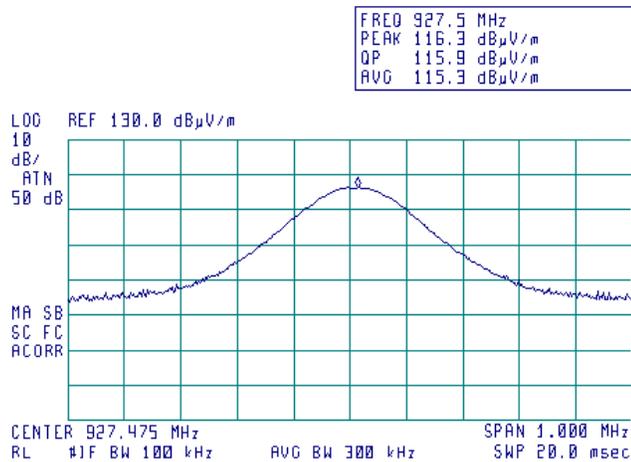
**Plot 8.8.5 Radiated emission measurements at the high carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



**Plot 8.8.6 Radiated emission measurements at the high carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Horizontal

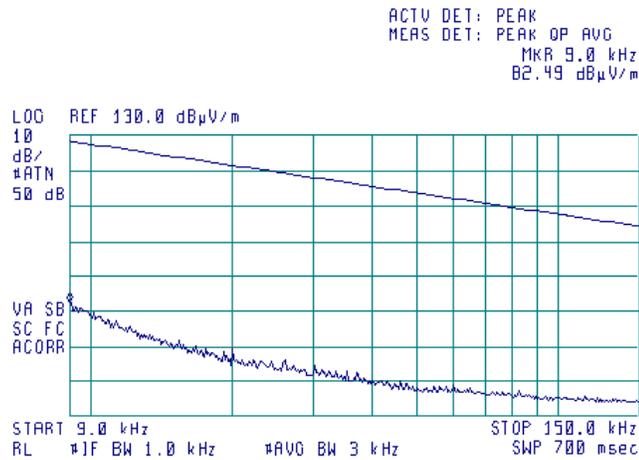




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

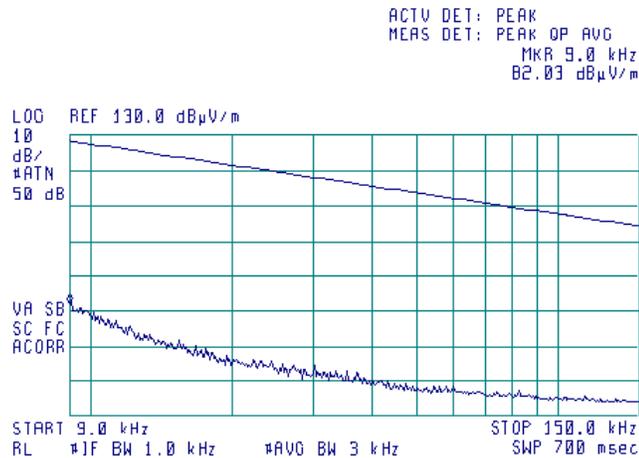
**Plot 8.8.7 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.8 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

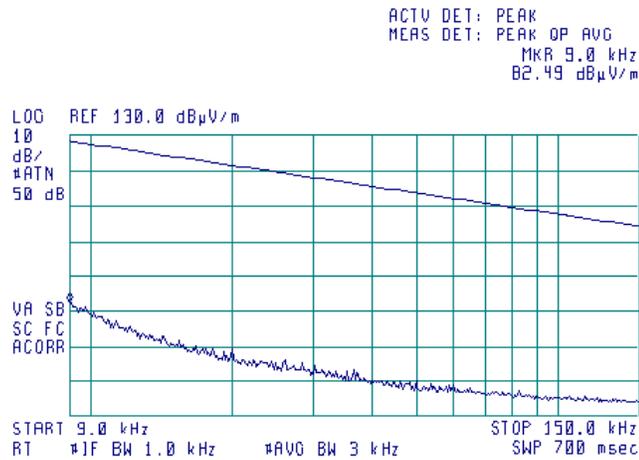




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

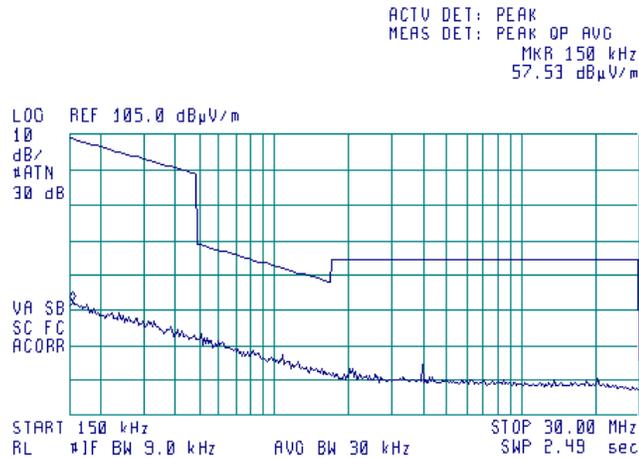
**Plot 8.8.9 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.10 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

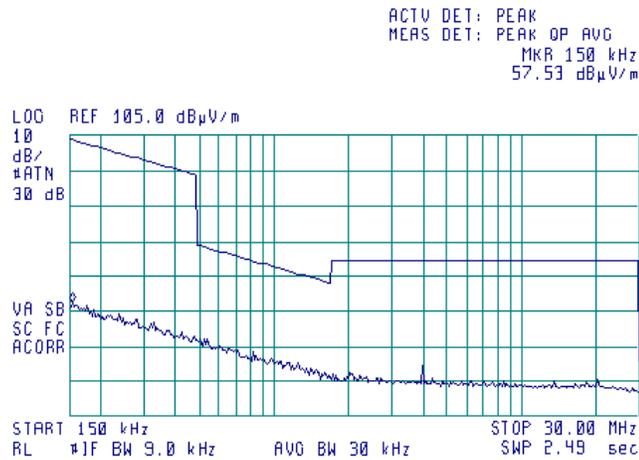




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

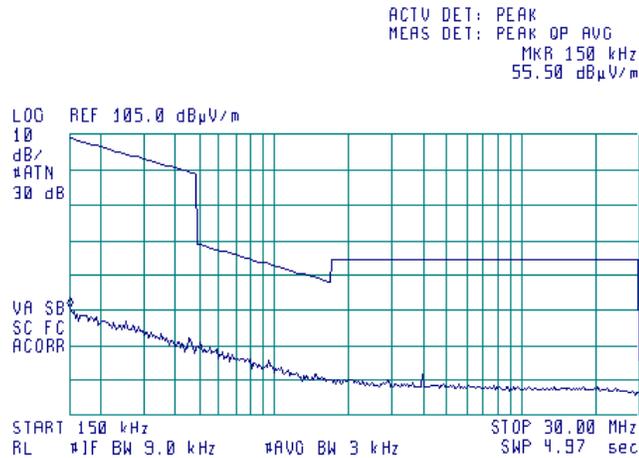
**Plot 8.8.11 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.12 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

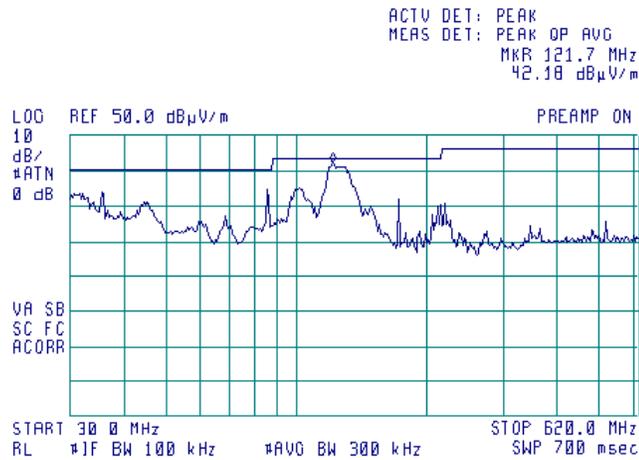




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

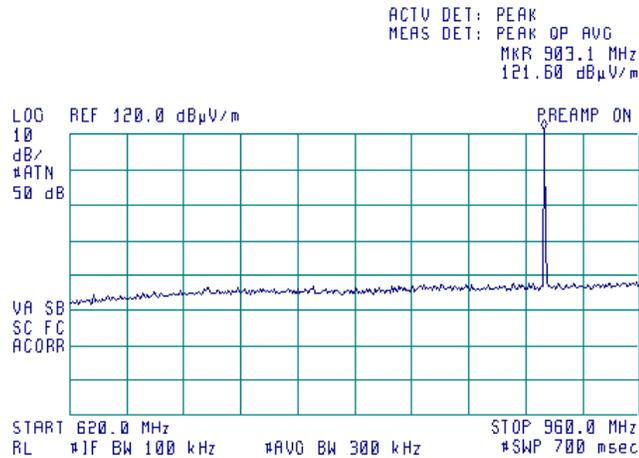
**Plot 8.8.13 Radiated emission measurements from 30 to 620 MHz at the low carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.14 Radiated emission measurements from 620 to 960 MHz at the low carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

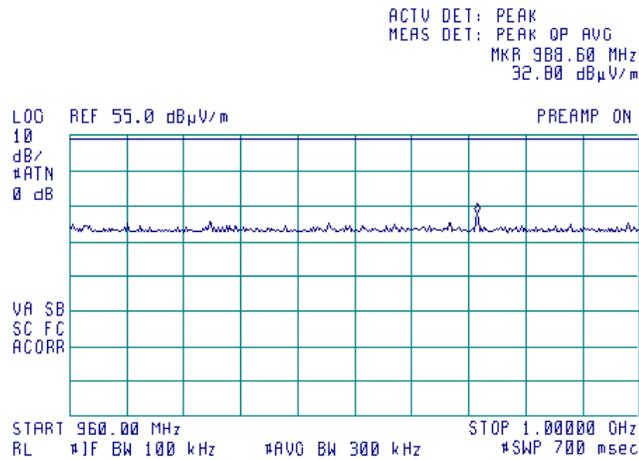




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

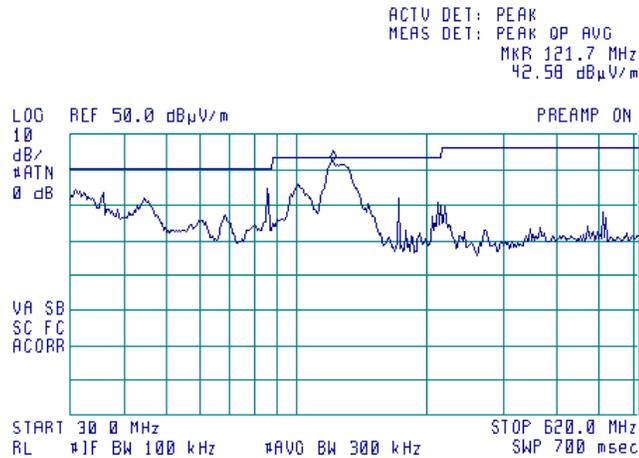
**Plot 8.8.15 Radiated emission measurements from 960 to 1000 MHz at the low carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.16 Radiated emission measurements from 30 to 620 MHz at the mid carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

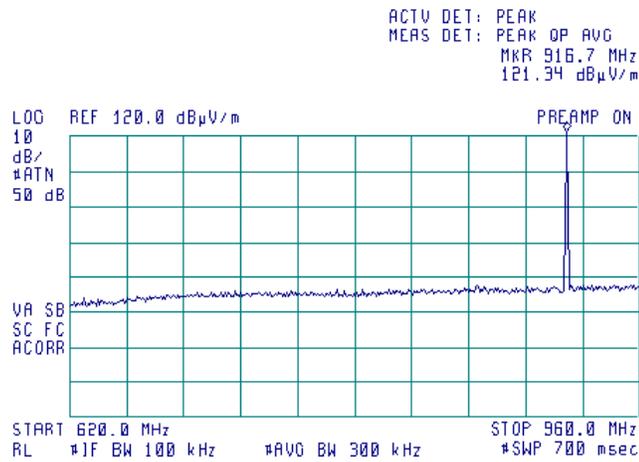




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

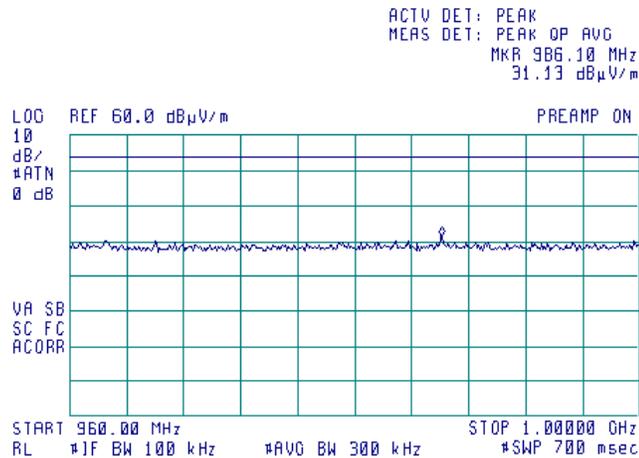
**Plot 8.8.17 Radiated emission measurements from 620 to 960 MHz at the mid carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.18 Radiated emission measurements from 960 to 1000 MHz at the mid carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

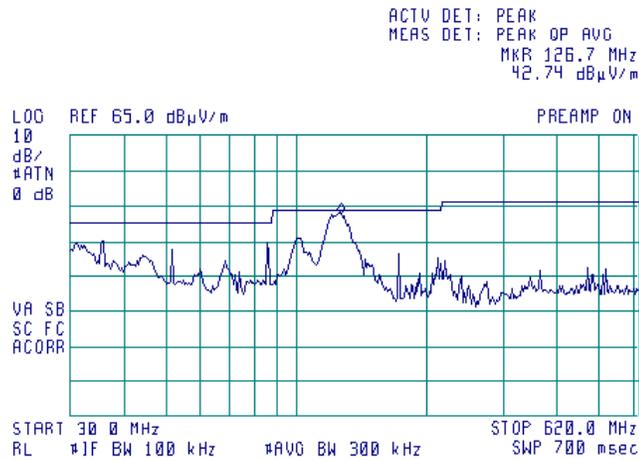




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

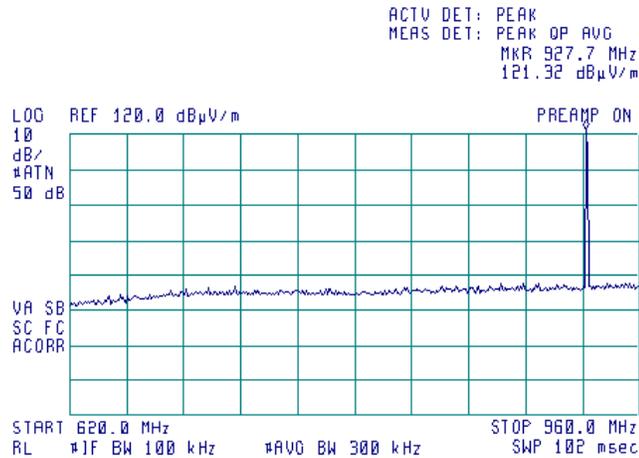
Plot 8.8.19 Radiated emission measurements from 30 to 620 MHz at the high carrier frequency

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.20 Radiated emission measurements from 620 to 960 MHz at the high carrier frequency

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

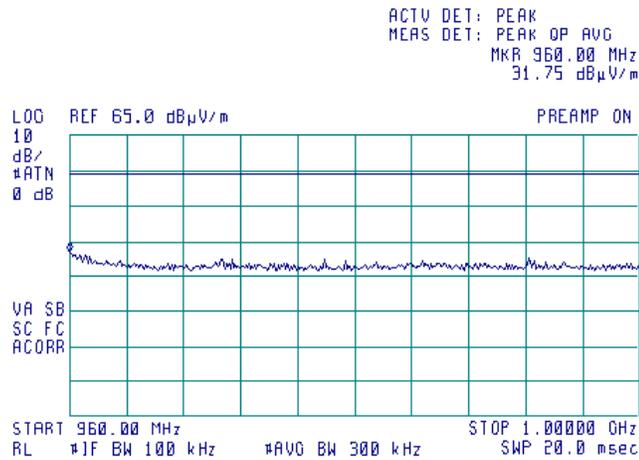




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

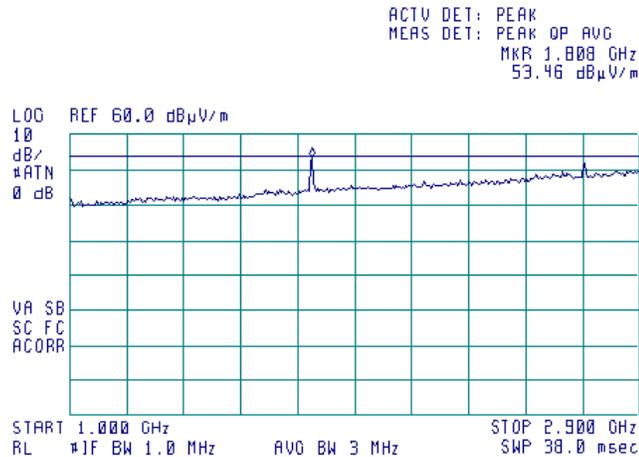
**Plot 8.8.21 Radiated emission measurements from 960 to 1000 MHz at the high carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.22 Radiated emission measurements from 1000 to 2900 MHz at the low carrier frequency**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

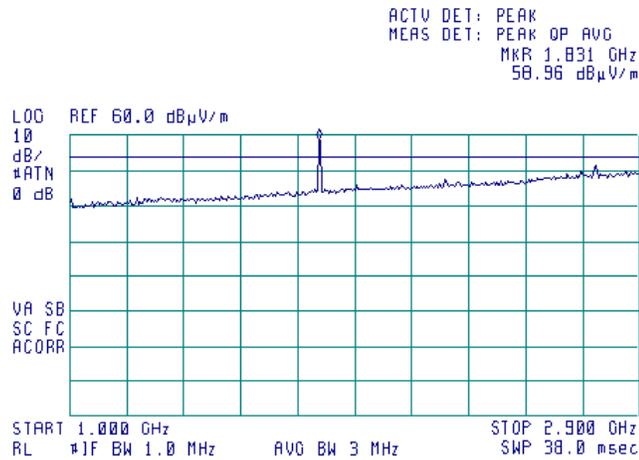




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

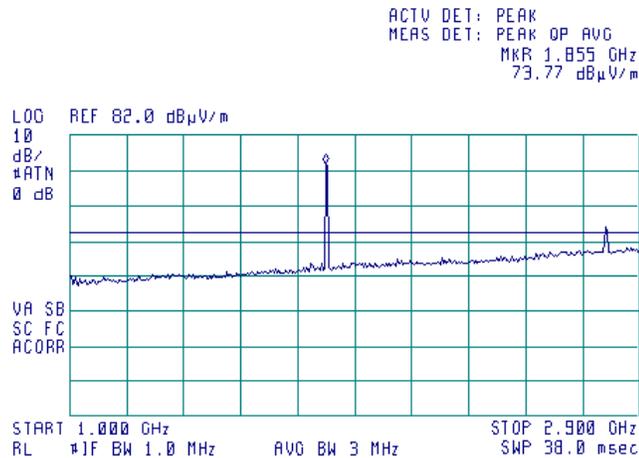
**Plot 8.8.23 Radiated emission measurements from 1000 to 2900 MHz at the mid carrier frequency**

TEST SITE: Anechoic chamber / OATS / Semi anechoic chamber  
 TEST DISTANCE: 3 m  
 ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 8.8.24 Radiated emission measurements from 1000 to 2900 MHz at the high carrier frequency**

TEST SITE: Anechoic chamber / OATS / Semi anechoic chamber  
 TEST DISTANCE: 3 m  
 ANTENNA POLARIZATION: Vertical and Horizontal

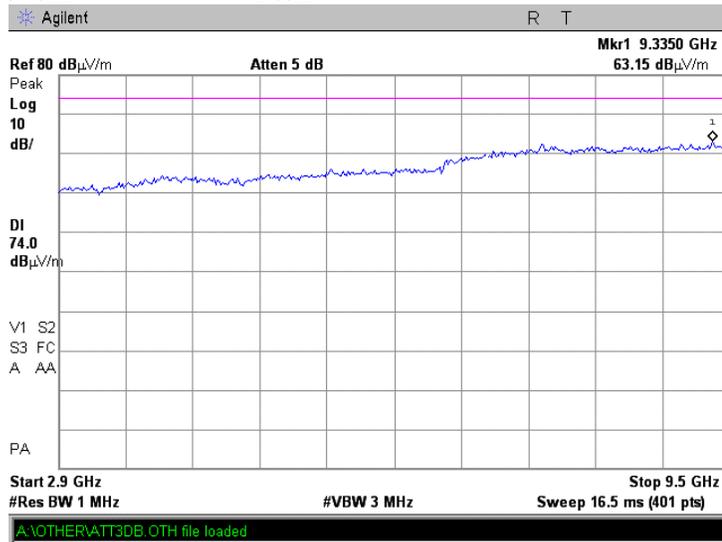




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.8.25 Radiated emission measurements from 2900 to 9500 MHz at the low carrier frequency

TEST SITE: Anechoic chamber  
 TEST DISTANCE: 3 m  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 DETECTOR: Peak



Plot 8.8.26 Radiated emission measurements from 2900 to 9500 MHz at the low carrier frequency

TEST SITE: Anechoic chamber  
 TEST DISTANCE: 3 m  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 DETECTOR: Average

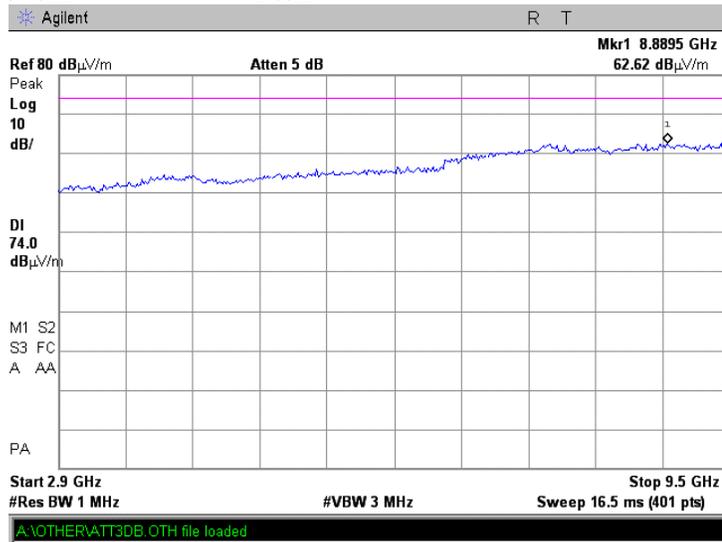




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.8.27 Radiated emission measurements from 2900 to 9500 MHz at the mid carrier frequency

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: Peak



Plot 8.8.28 Radiated emission measurements from 2900 to 9500 MHz at the mid carrier frequency

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: Average

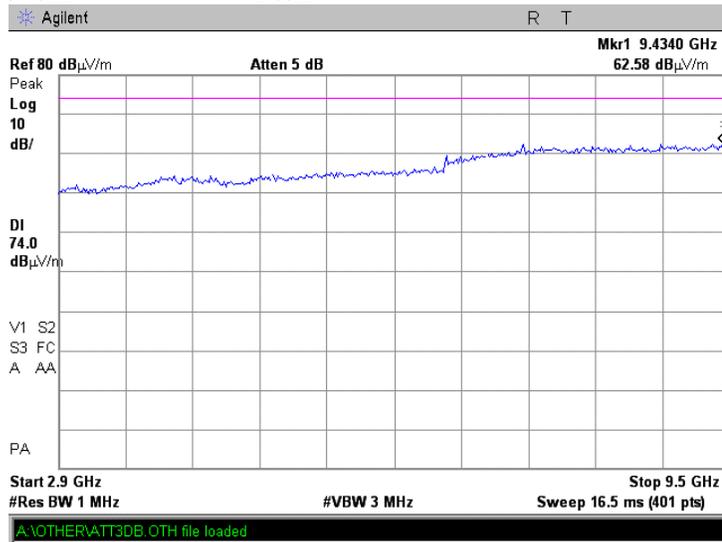




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

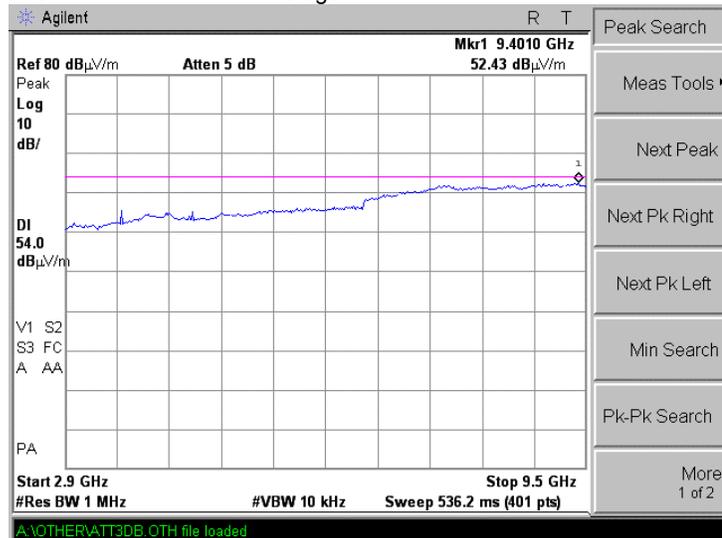
Plot 8.8.29 Radiated emission measurements from 2900 to 9500 MHz at the high carrier frequency

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: Peak



Plot 8.8.30 Radiated emission measurements from 2900 to 9500 MHz at the high carrier frequency

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: Average



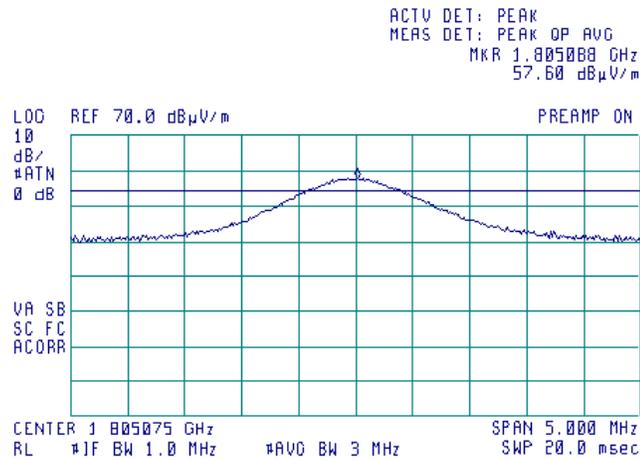


<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Plot 8.8.31 Radiated emission measurements at the second harmonic of low carrier frequency**

TEST SITE: Semi-anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

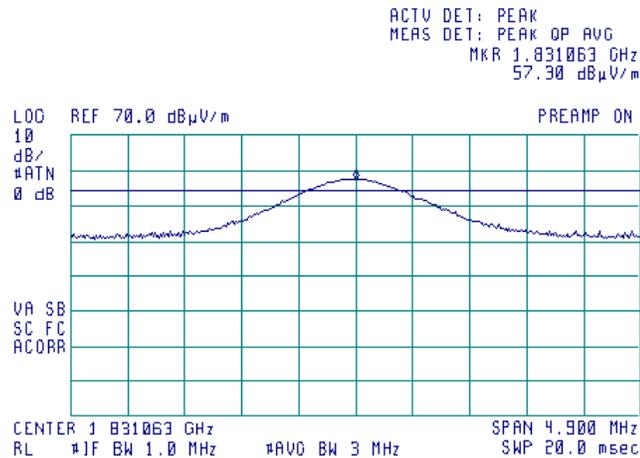
19:26:02 OCT 17, 2007



**Plot 8.8.32 Radiated emission measurements at the second harmonic of mid carrier frequency**

TEST SITE: Semi-anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

19:05:08 OCT 17, 2007



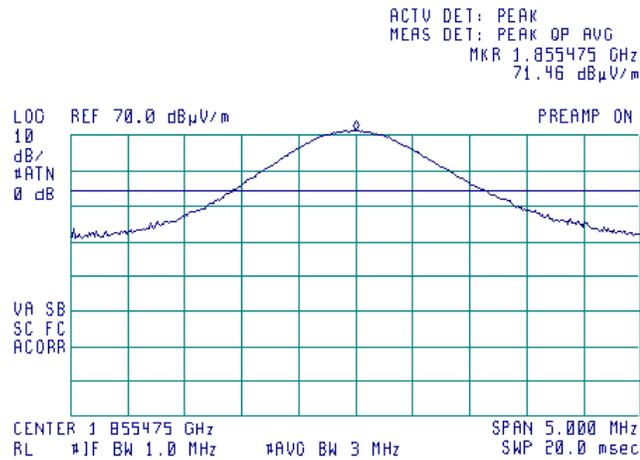


<b>Test specification:</b> Section 15.247(c), Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/17/2007 7:02:18 PM			
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.8.33 Radiated emission measurements at the second harmonic of high carrier frequency

TEST SITE: Semi-anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

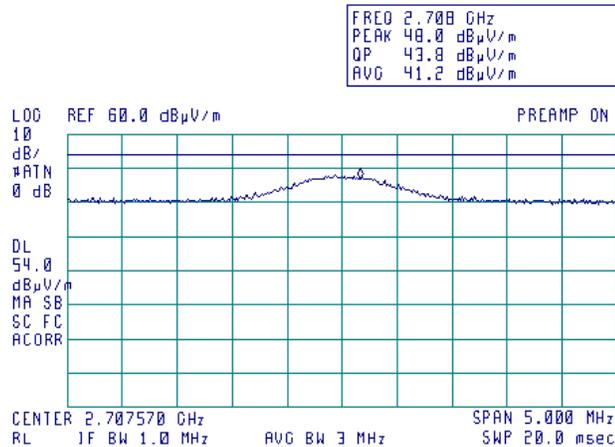
19:34:28 OCT 17, 2007



Plot 8.8.34 Radiated emission measurements at the third harmonic of low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal

19:34:28 OCT 17, 2007

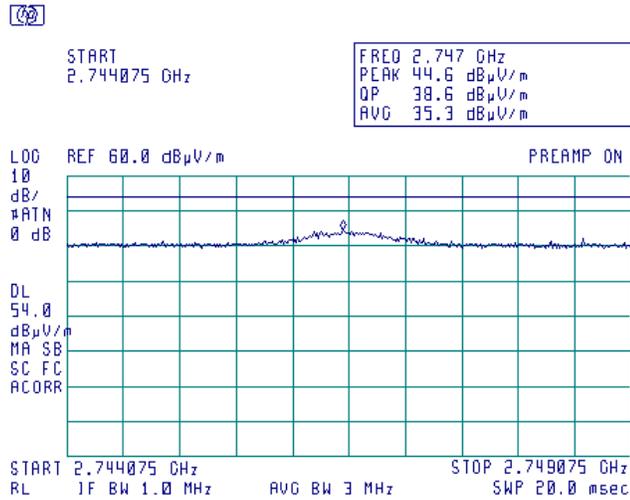




<b>Test specification:</b> Section 15.247(c), Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 10/17/2007 7:02:18 PM			
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

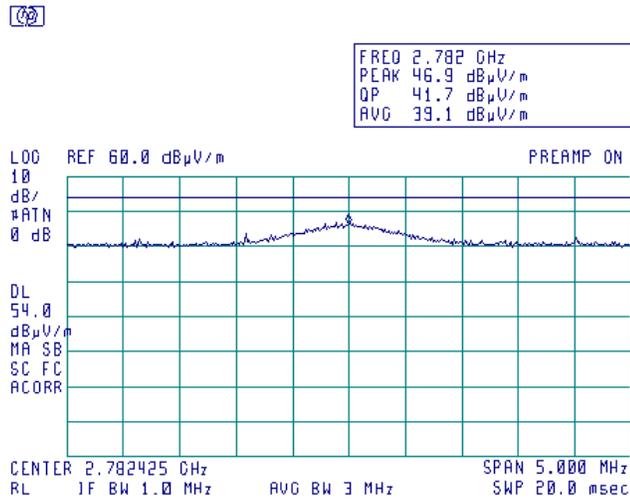
**Plot 8.8.35 Radiated emission measurements at the third harmonic of mid carrier frequency**

TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



**Plot 8.8.36 Radiated emission measurements at the third harmonic of high carrier frequency**

TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal

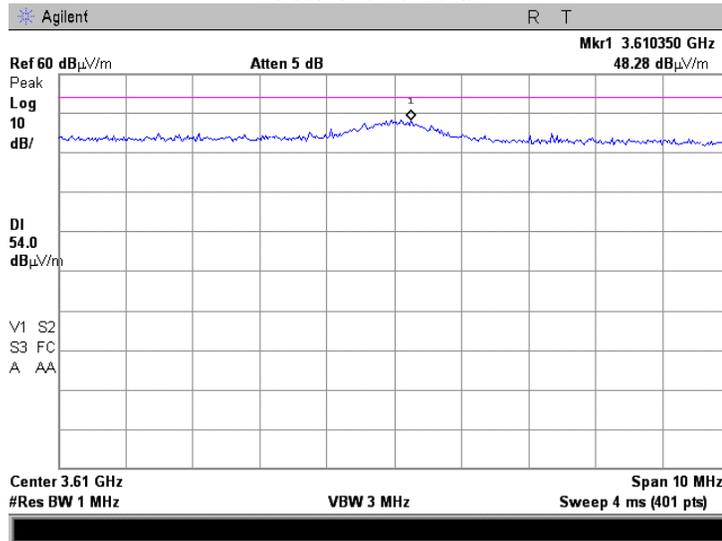




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

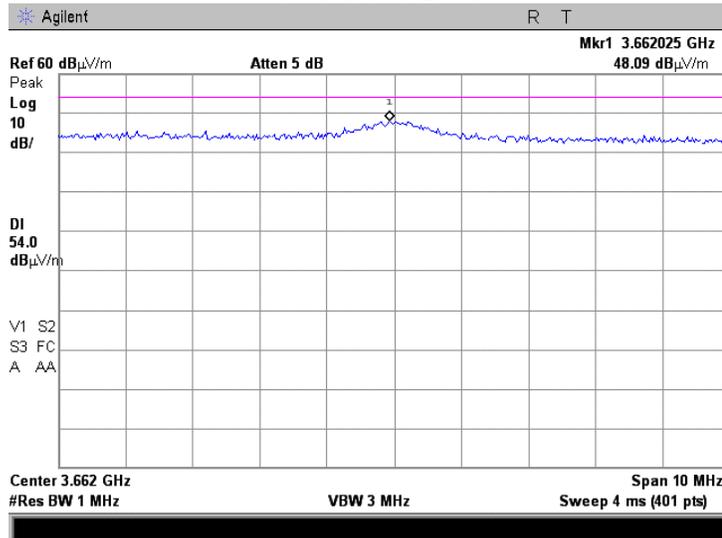
Plot 8.8.37 Radiated emission measurements at the fourth harmonic of low carrier frequency

TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



Plot 8.8.38 Radiated emission measurements at the fourth harmonic of mid carrier frequency

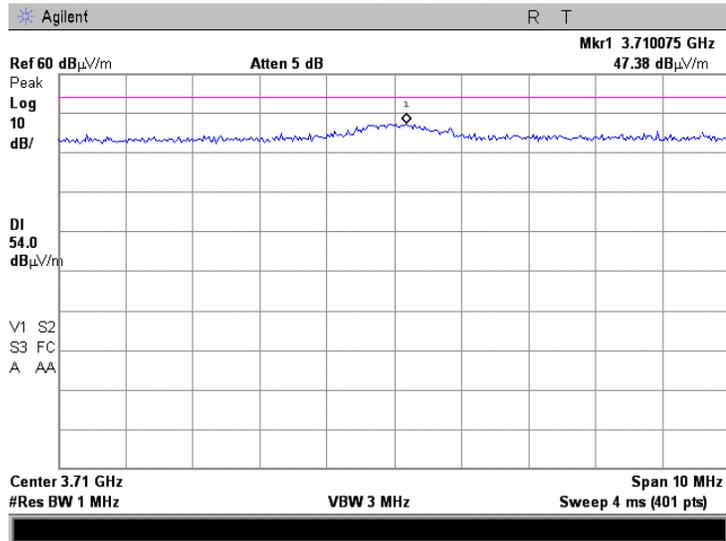
TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

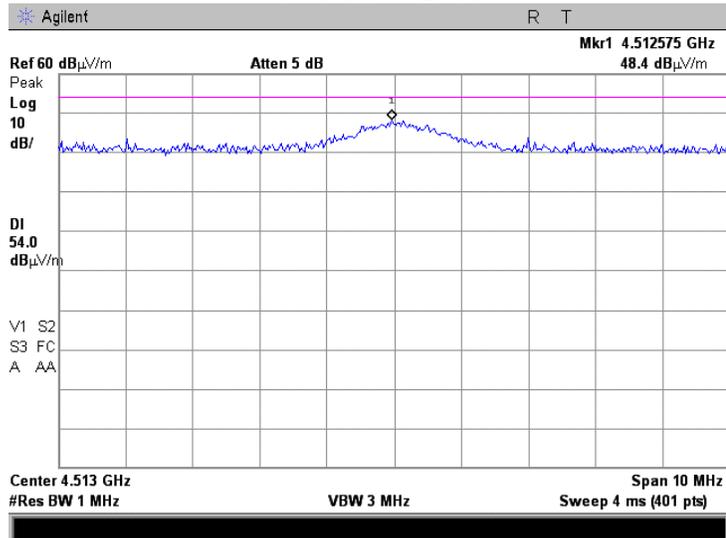
**Plot 8.8.39 Radiated emission measurements at the fourth harmonic of high carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



**Plot 8.8.40 Radiated emission measurements at the fifth harmonic of low carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal

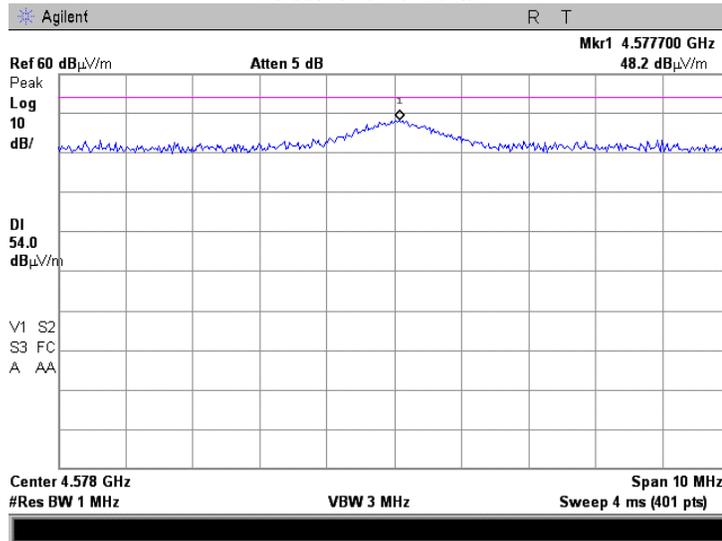




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

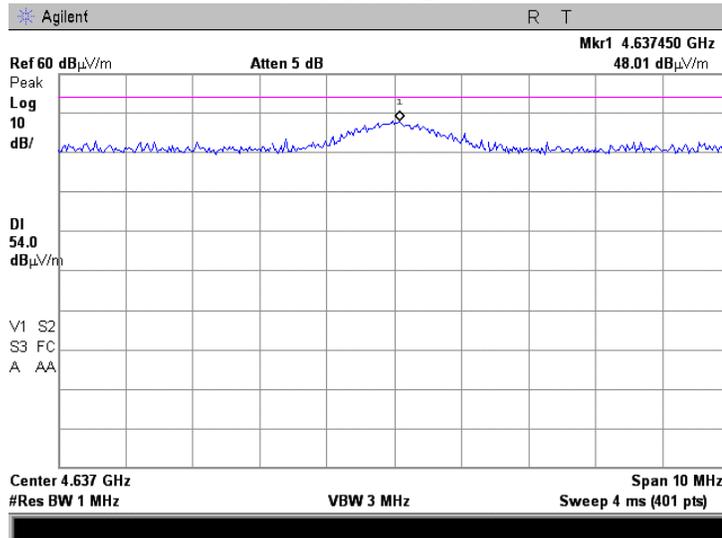
Plot 8.8.41 Radiated emission measurements at the fifth harmonic of mid carrier frequency

TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



Plot 8.8.42 Radiated emission measurements at the fifth harmonic of high carrier frequency

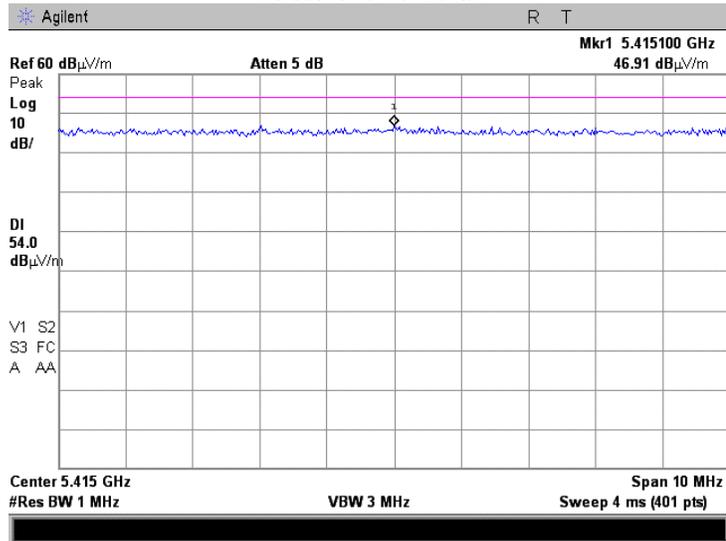
TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

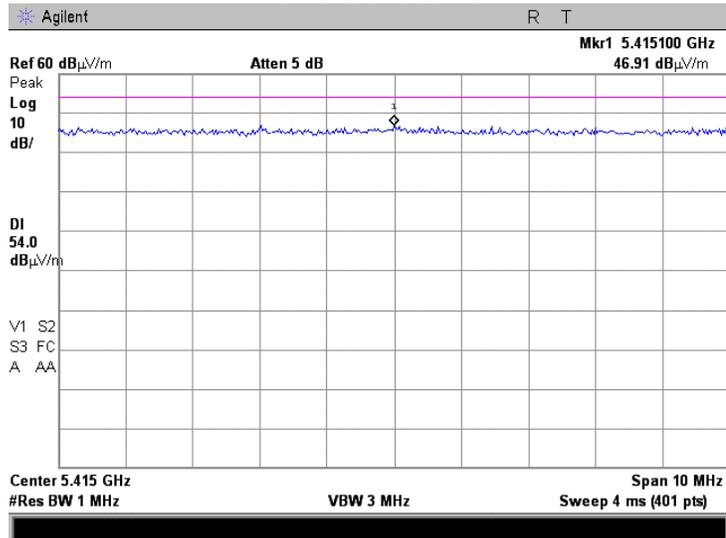
**Plot 8.8.43 Radiated emission measurements at the sixth harmonic of low carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



**Plot 8.8.44 Radiated emission measurements at the sixth harmonic of mid carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal

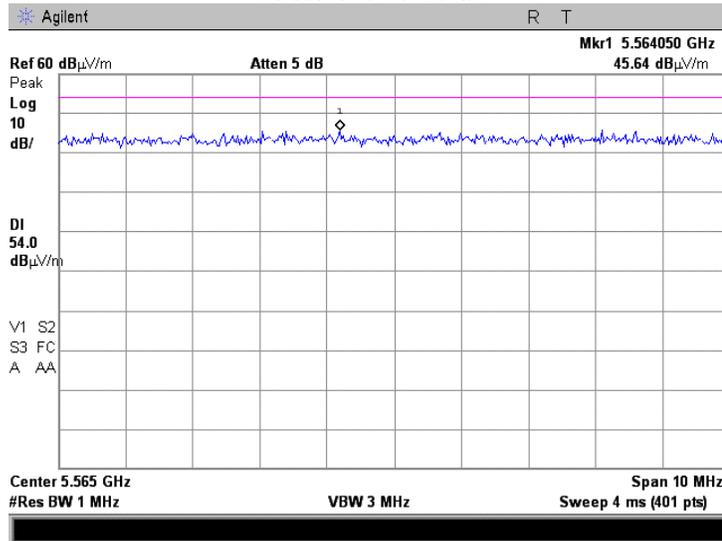




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

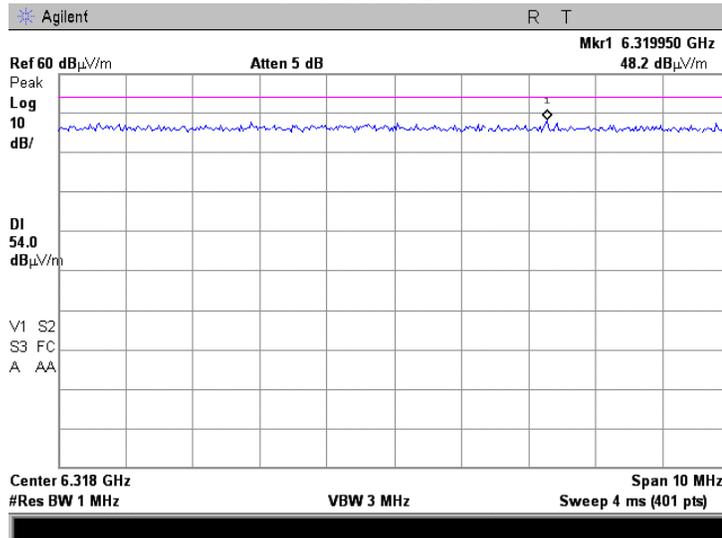
**Plot 8.8.45 Radiated emission measurements at the sixth harmonic of high carrier frequency**

TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



**Plot 8.8.46 Radiated emission measurements at the seventh harmonic of low carrier frequency**

TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal

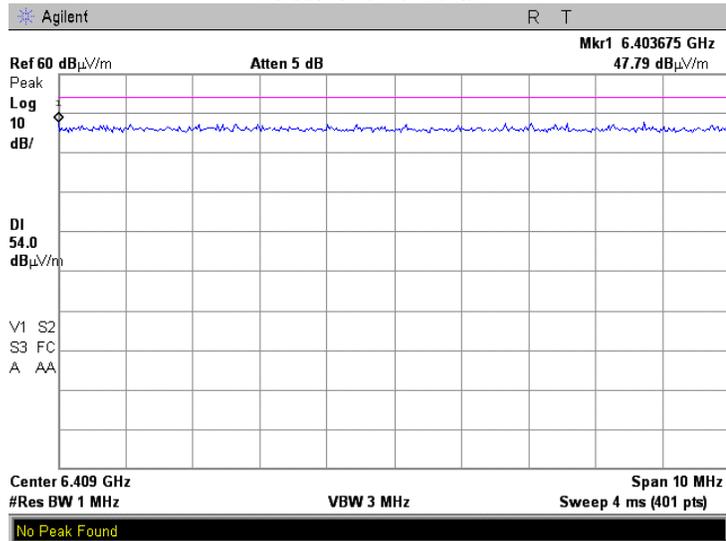




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

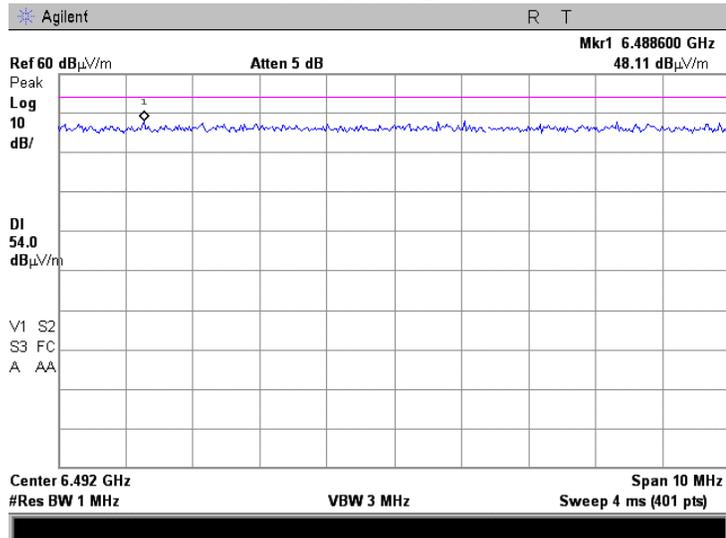
Plot 8.8.47 Radiated emission measurements at the seventh harmonic of mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



Plot 8.8.48 Radiated emission measurements at the seventh harmonic of high carrier frequency

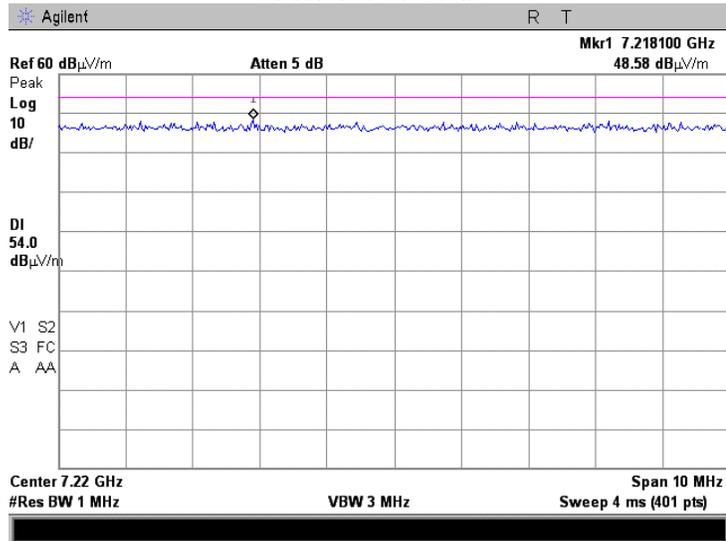
TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

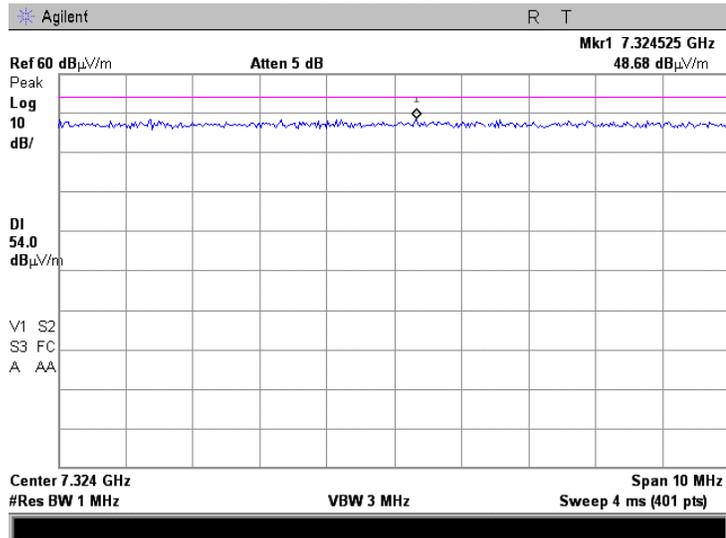
**Plot 8.8.49 Radiated emission measurements at the eighth harmonic of low carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



**Plot 8.8.50 Radiated emission measurements at the eighth harmonic of mid carrier frequency**

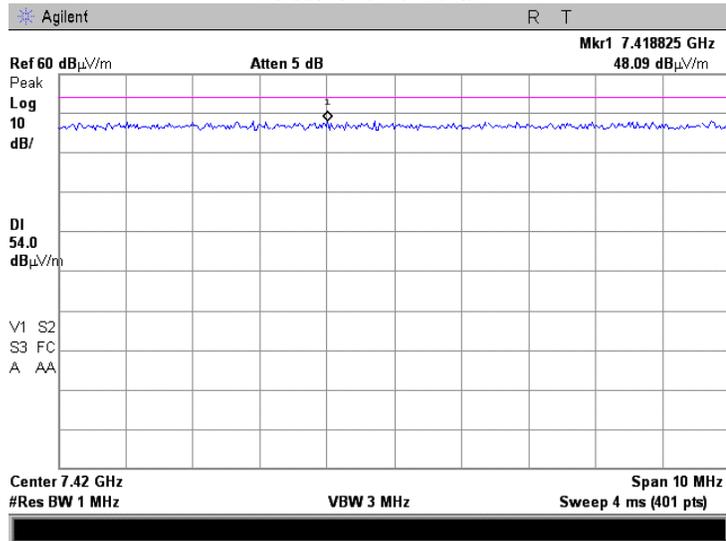
TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

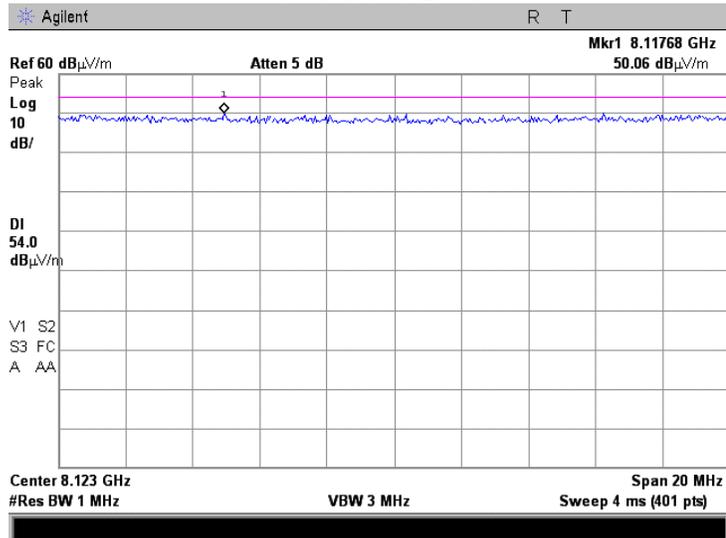
Plot 8.8.51 Radiated emission measurements at the eighth harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



Plot 8.8.52 Radiated emission measurements at the ninth harmonic of low carrier frequency

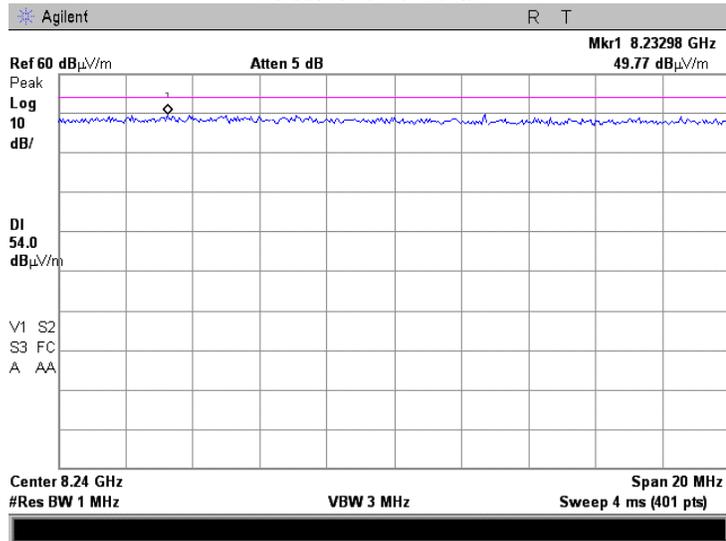
TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

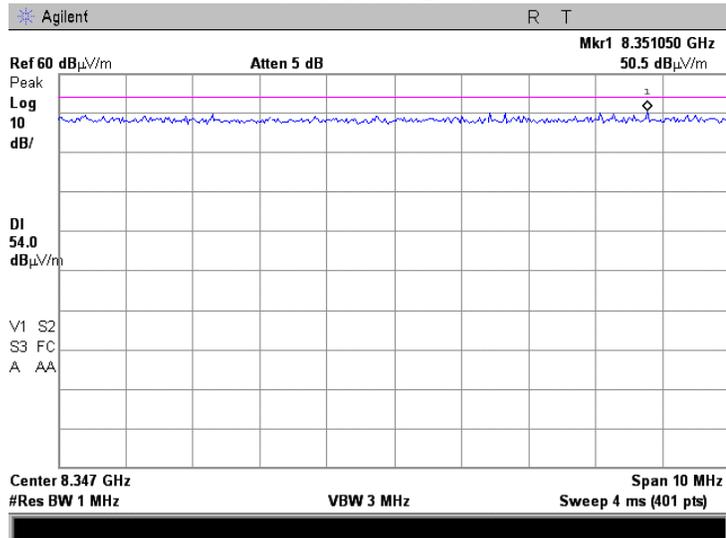
**Plot 8.8.53 Radiated emission measurements at the ninth harmonic of mid carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



**Plot 8.8.54 Radiated emission measurements at the ninth harmonic of high carrier frequency**

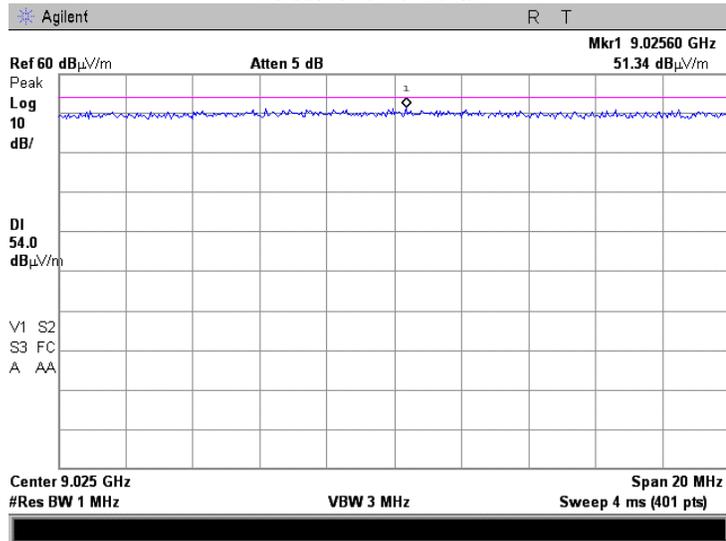
TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

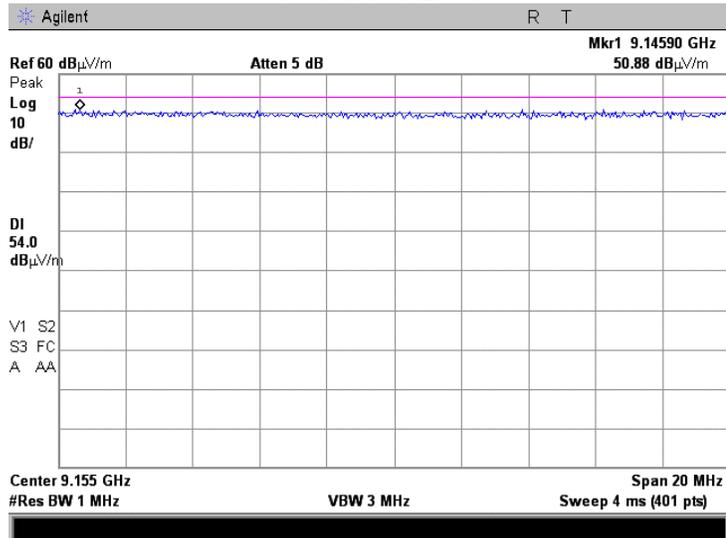
**Plot 8.8.55 Radiated emission measurements at the tenth harmonic of low carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal



**Plot 8.8.56 Radiated emission measurements at the tenth harmonic of mid carrier frequency**

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA: Vertical and Horizontal

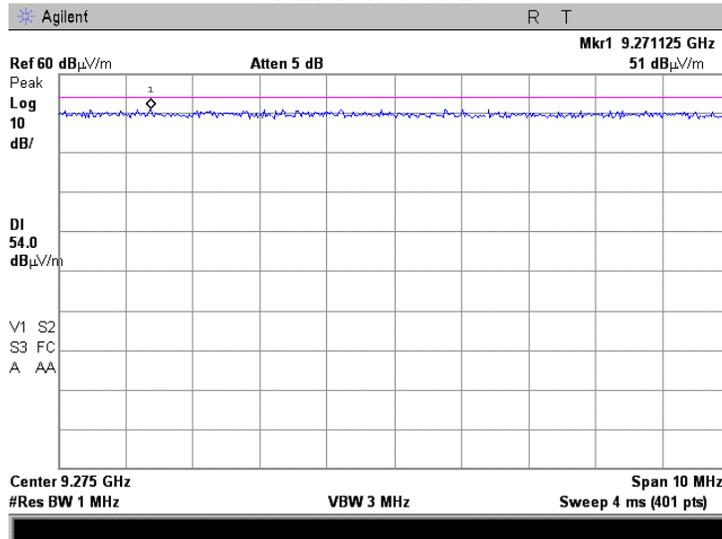




<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Plot 8.8.57 Radiated emission measurements at the tenth harmonic of high carrier frequency**

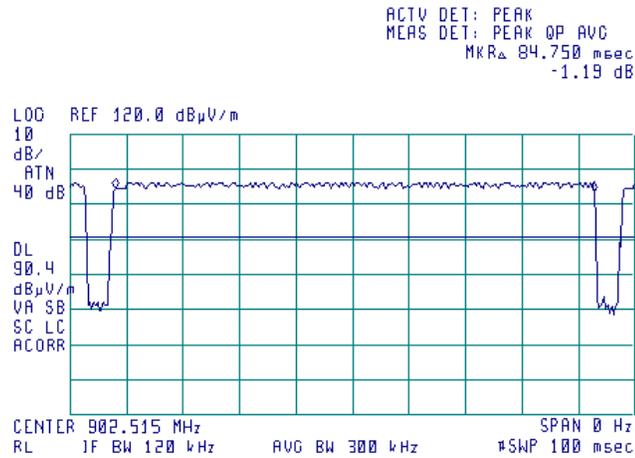
TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 ANTENNA: Vertical and Horizontal



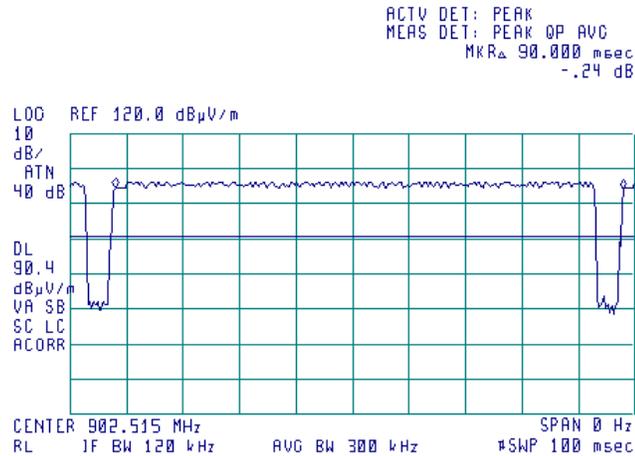


<b>Test specification:</b>	<b>Section 15.247(c), Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/17/2007 7:02:18 PM		
<b>Temperature:</b> 22°C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.8.58 Transmission pulse duration



Plot 8.8.59 Transmission pulse period





<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 8.9 Spurious emissions at RF antenna connector

### 8.9.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 8.9.1.

Table 8.9.1 Spurious emission limits

Frequency*, MHz	Attenuation below carrier*, dBc
0.009 – 10 <sup>th</sup> harmonic	20.0

\* - The above limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

\*\* - Spurious emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

### 8.9.2 Test procedure

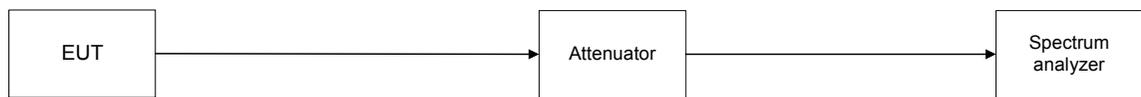
8.9.2.1 The EUT was set up as shown in Figure 8.9.1, energized and its proper operation was checked.

8.9.2.2 The EUT was adjusted to produce maximum available to end user RF output power.

8.9.2.3 The highest emission level within the authorized band was measured.

8.9.2.4 The spurious emission was measured with spectrum analyzer as provided in Table 8.9.2 and associated plots and referenced to the highest emission level measured within the authorized band.

Figure 8.9.1 Spurious emission test setup





<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 8.9.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 902.0 – 928.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 9300 MHz  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 100 kHz  
 VIDEO BANDWIDTH: 300 kHz  
 MODULATION: FSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 9.6 kbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 FREQUENCY HOPPING: Disabled

Frequency, MHz	Spurious emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
<b>Low carrier frequency</b>						
No emissions were found						Pass
<b>Mid carrier frequency</b>						
No emissions were found						Pass
<b>High carrier frequency</b>						
No emissions were found						Pass

\*- Margin = Attenuation below carrier – specification limit.

## Reference numbers of test equipment used

HL 0758	HL 0773	HL 2780	HL 2882	HL 3176	HL 3179	HL 3181	
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Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.1 The highest emission level within the assigned band at low carrier frequency

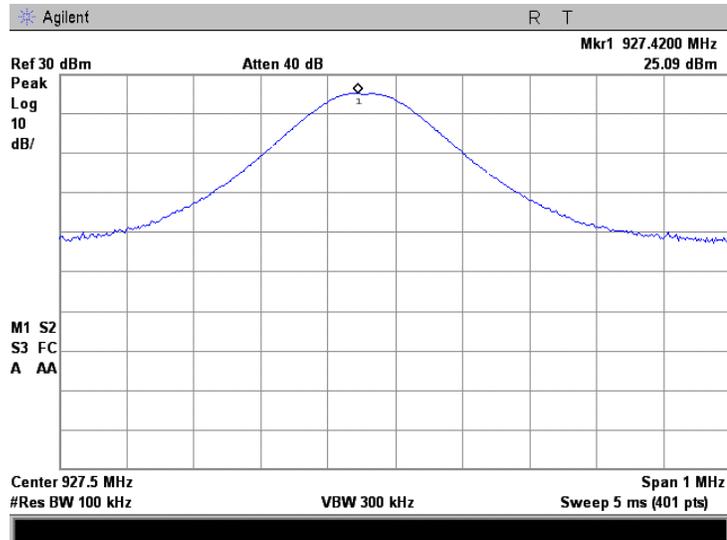


Plot 8.9.2 The highest emission level within the assigned band at mid carrier frequency

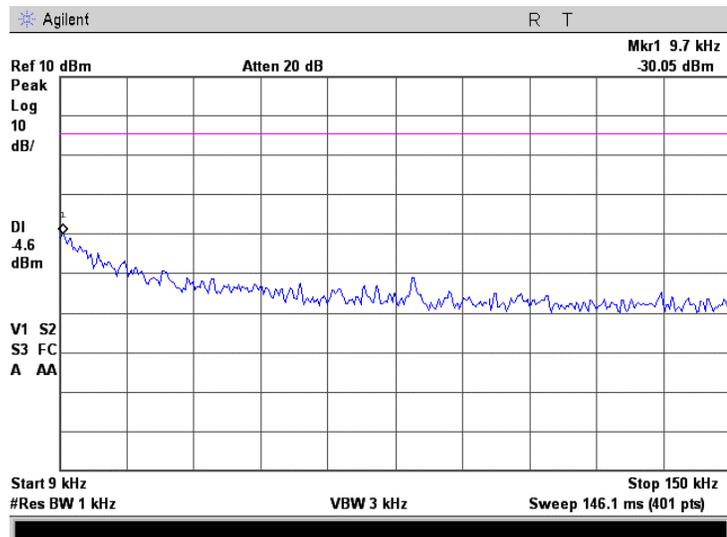


<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.3 The highest emission level within the assigned band at high carrier frequency



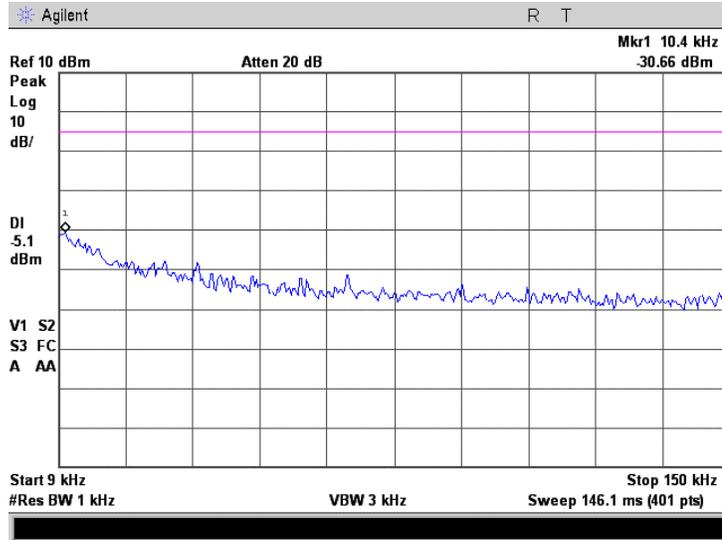
Plot 8.9.4 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency



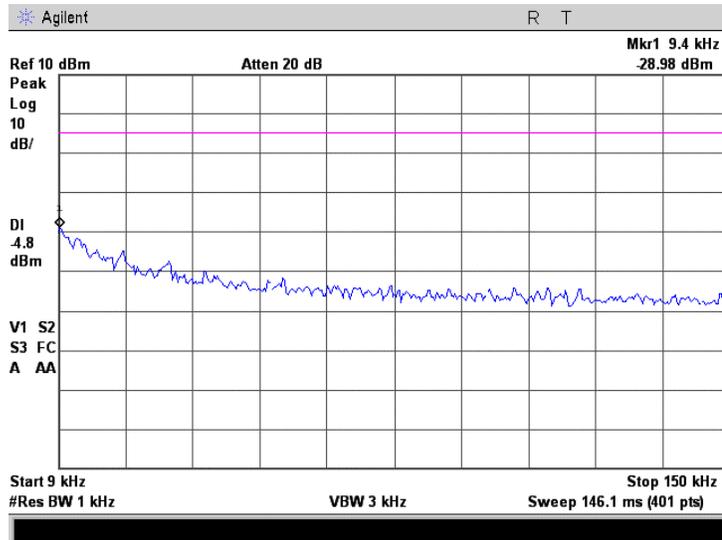


<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.5 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

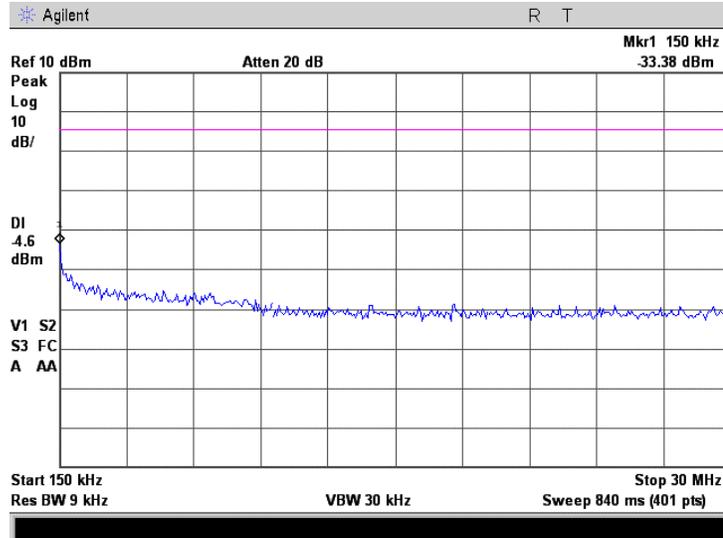


Plot 8.9.6 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

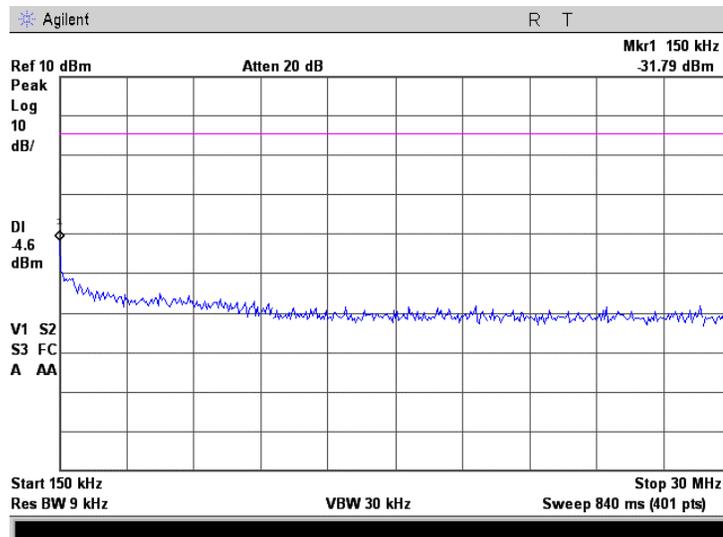


<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.7 Spurious emission measurements in 0.15 - 30 MHz range at low carrier frequency

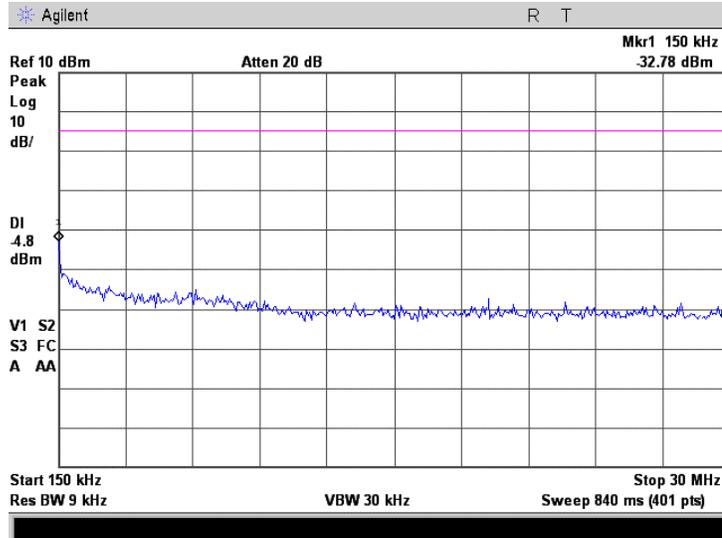


Plot 8.9.8 Spurious emission measurements in 0.15 - 30 MHz range at mid carrier frequency

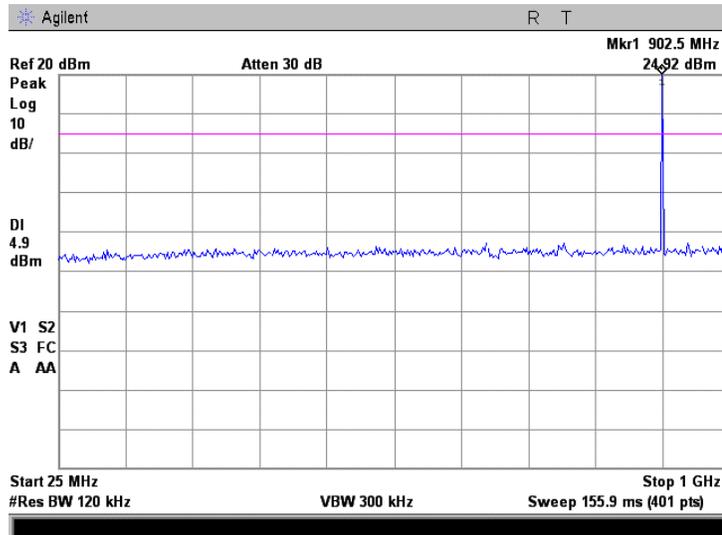


<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.9 Spurious emission measurements in 0.15 - 30 MHz range at high carrier frequency



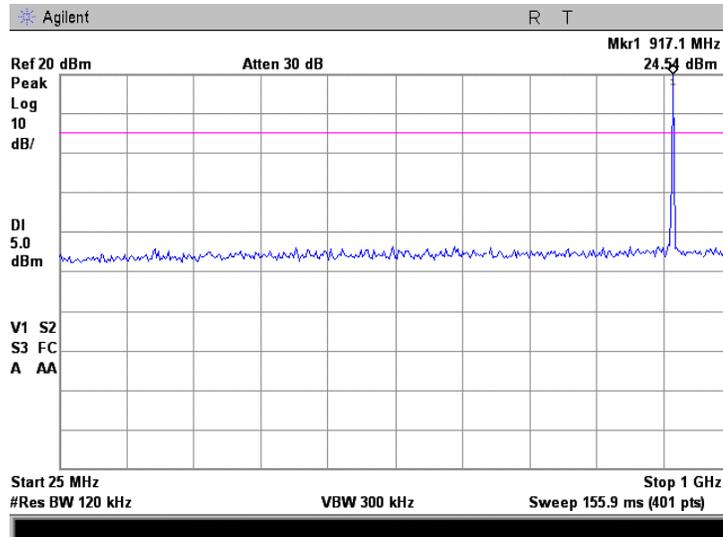
Plot 8.9.10 Spurious emission measurements in 30 - 1000 MHz range at low carrier frequency



Note: 903.0 MHz - Fundamental emission at low carrier of ISM

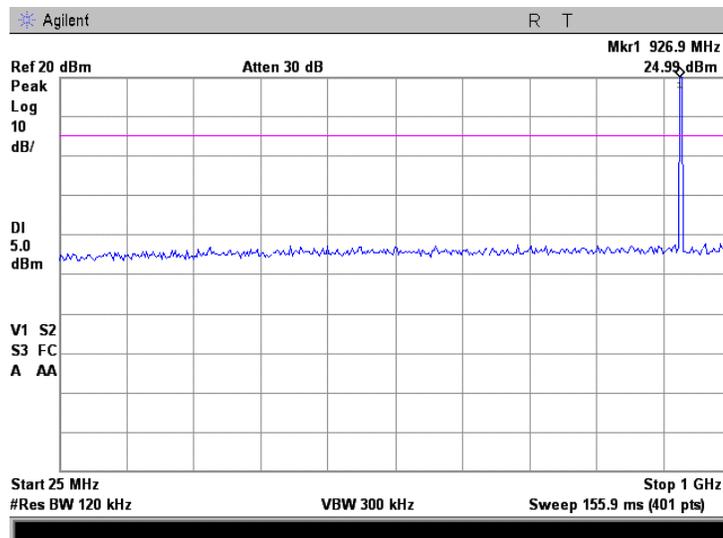
<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.11 Spurious emission measurements in 30 - 1000 MHz range at mid carrier frequency



Note: 915.1 MHz - Fundamental emission at mid carrier of ISM

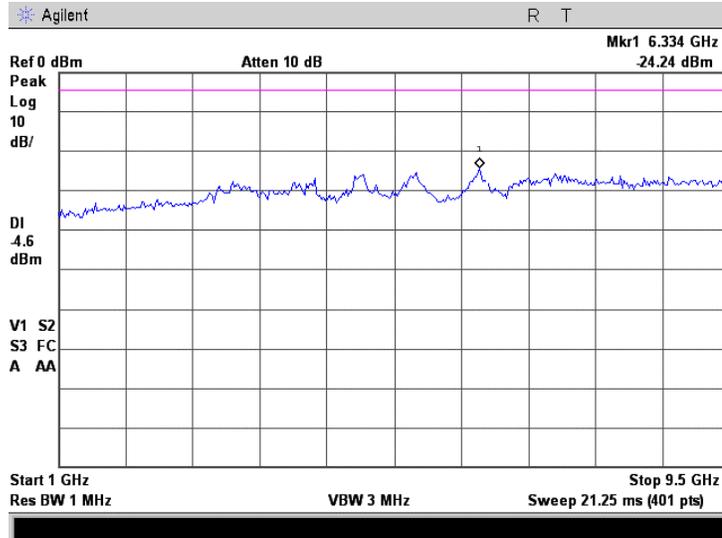
Plot 8.9.12 Spurious emission measurements in 30 - 1000 MHz range at high carrier frequency



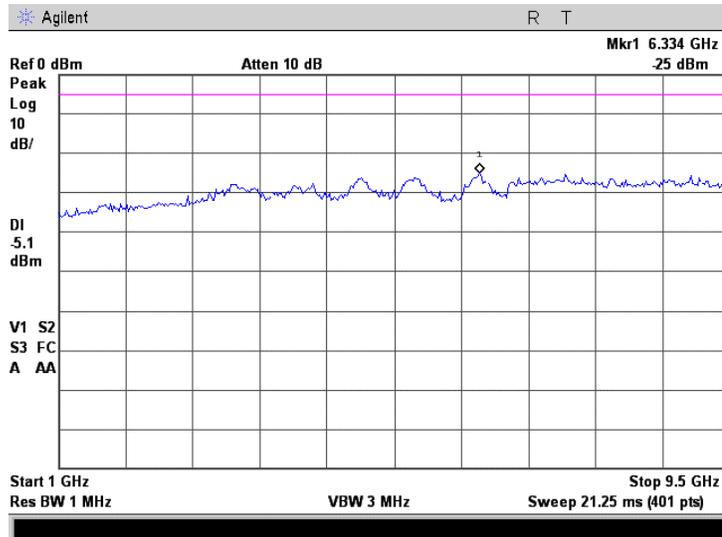
Note: 927.3 MHz - Fundamental emission at high carrier of ISM

<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.13 Spurious emission measurements in 1000 - 9500 MHz range at low carrier frequency



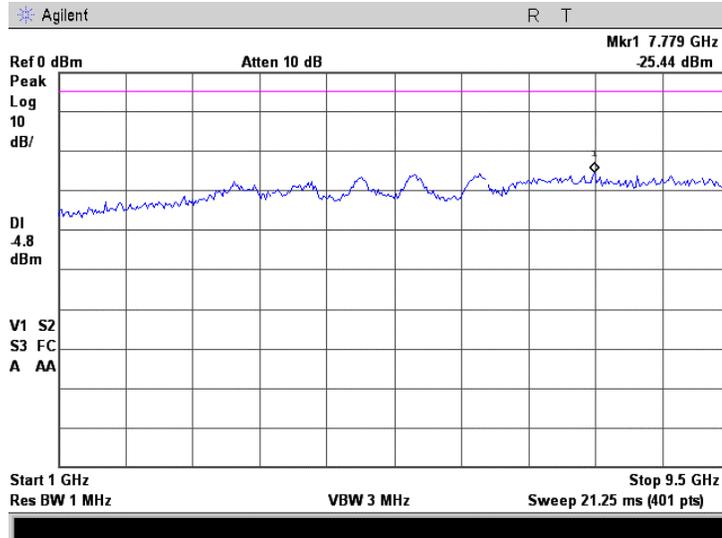
Plot 8.9.14 Spurious emission measurements in 1000 - 9500 MHz range at mid carrier frequency





<b>Test specification:</b>	<b>Section 15.247(c), Conducted spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705/ 47 CFR, Section 15.247(c)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	10/9/2007 6:12:47 PM		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Plot 8.9.15 Spurious emission measurements in 1000 - 9500 MHz range at high carrier frequency





HERMON LABORATORIES

<b>Test specification:</b> Section 15.107, Conducted emission at AC power port			
<b>Test procedure:</b> ANSI C63.4, Sections 11.5 and 12.1.3			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 7/5/2006 2:46:17 PM			
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 9 Emissions tests according to 47CFR part 15 subpart B requirements

### 9.1 Conducted emissions

#### 9.1.1 General

This test was performed to measure common mode conducted emissions at the mains power port. Specification test limits are given in Table 9.1.1.

Table 9.1.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(μV)		Class A limit, dB(μV)	
	QP	AVRG	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*	79	66
0.5 - 5.0	56	46	73	60
5.0 - 30	60	50	73	60

\* The limit decreases linearly with the logarithm of frequency.

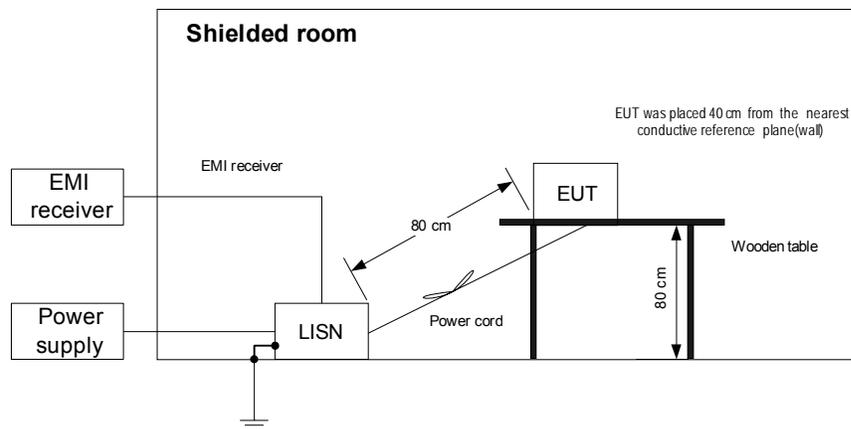
#### 9.1.2 Test procedure

9.1.2.1 The EUT was set up as shown in Figure 9.1.1, energized and the performance check was conducted.

9.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 9.1.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

9.1.2.3 The position of the device cables was varied to determine maximum emission level.

Figure 9.1.1 Setup for conducted emission measurements, table-top equipment





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<b>Test specification:</b> Section 15.107, Conducted emission at AC power port	
<b>Test procedure:</b> ANSI C63.4, Sections 11.5 and 12.1.3	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b> 7/5/2006 2:46:17 PM	
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> hPa
<b>Remarks:</b>	

Table 9.1.2 Conducted emission test results

LINE: AC mains  
LIMIT: Class B  
EUT OPERATING MODE: Receive / Stand-by  
EUT SET UP: TABLE-TOP  
TEST SITE: SHIELDED ROOM  
DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE  
FREQUENCY RANGE: 150 kHz - 30 MHz  
RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.150000	60.32	52.36	66.00	-13.64	16.87	56.00	-39.13	L1	Pass
0.227783	49.66	39.01	62.59	-23.58	10.64	52.59	-41.95		
0.452870	43.23	32.23	56.88	-24.65	5.13	46.88	-41.75		
10.533625	30.33	26.25	60.00	-33.75	19.54	50.00	-30.46		
0.150000	62.25	54.92	66.00	-11.08	24.36	56.00	-31.64	L2	Pass
0.209333	50.46	39.77	63.29	-23.52	13.68	53.29	-39.61		
0.457846	44.13	35.18	56.79	-21.61	6.55	46.79	-40.24		
0.500000	43.21	33.99	56.00	-22.01	6.38	46.00	-39.62		
15.826931	32.74	30.85	60.00	-29.15	28.19	50.00	-21.81		

\*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

HL 0163	HL 0787	HL 1430	HL 1502	HL 1510	HL 2358		
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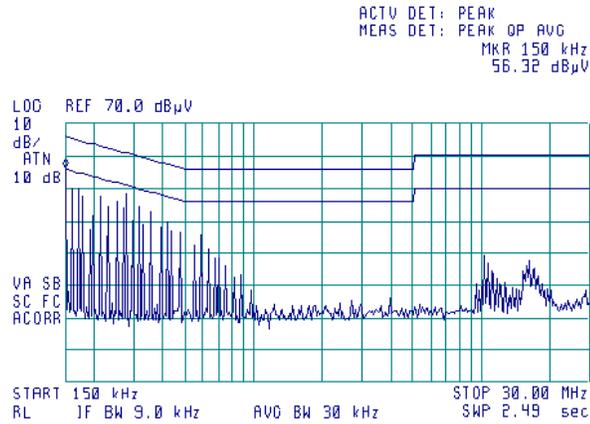
Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 15.107, Conducted emission at AC power port</b>		
<b>Test procedure:</b>	ANSI C63.4, Sections 11.5 and 12.1.3		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/5/2006 2:46:17 PM		
<b>Temperature:</b> 24 °C	<b>Air Pressure:</b> hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

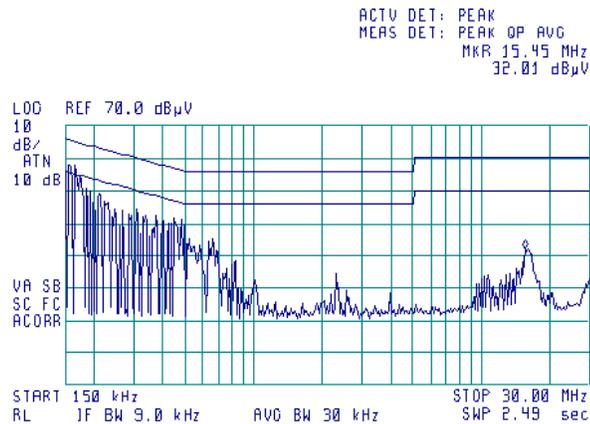
**Plot 9.1.1 Conducted emission measurements**

LINE: L1  
LIMIT: Class B  
EUT OPERATING MODE: Receive / Stand-by  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK



**Plot 9.1.2 Conducted emission measurements**

LINE: L2  
LIMIT: Class B  
EUT OPERATING MODE: Receive / Stand-by  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK





<b>Test specification:</b>	<b>Section 15.109, Radiated emission</b>		
<b>Test procedure:</b>	ANSI C63.4, Sections 11.6 and 12.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 3:00:29 PM		
<b>Temperature:</b> 24°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

## 9.2 Radiated emission measurements

### 9.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 9.2.1.

**Table 9.2.1 Radiated emission test limits**

Frequency, MHz	Class B limit, dB( $\mu$ V/m)		Class A limit, dB( $\mu$ V/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
Above 960	43.5*	54.0	49.5	60.0*

\* The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows:  $\text{Lim}_{S_2} = \text{Lim}_{S_1} + 20 \log(S_1/S_2)$ , where  $S_1$  and  $S_2$  – standard defined and test distance respectively in meters.

### 9.2.2 Test procedure for measurements in semi-anechoic chamber

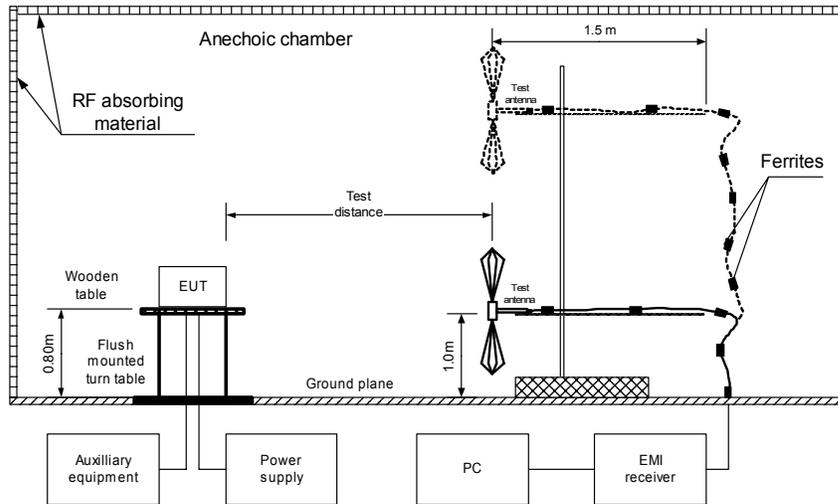
**9.2.2.1** The EUT was set up as shown in Figure 9.2.1 and associated photograph, energized and the performance check was conducted.

**9.2.2.2** The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated  $360^\circ$ , the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

**9.2.2.3** The worst test results (the lowest margins) were recorded in Table 9.2.2 and shown in the associated plots.

<b>Test specification:</b> Section 15.109, Radiated emission			
<b>Test procedure:</b> ANSI C63.4, Sections 11.6 and 12.1.4			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b> 7/4/2006 3:00:29 PM			
<b>Temperature:</b> 24°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Figure 9.2.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment





<b>Test specification:</b>		<b>Section 15.109, Radiated emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Sections 11.6 and 12.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 3:00:29 PM		
<b>Temperature:</b> 24°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

Table 9.2.2 Radiated emission test results

EUT SET UP: TABLE-TOP  
LIMIT: Class B  
EUT OPERATING MODE: Receive / Stand-by  
TEST SITE: SEMI ANECHOIC CHAMBER  
TEST DISTANCE: 3 m  
DETECTORS USED: PEAK / QUASI-PEAK  
FREQUENCY RANGE: 30 MHz – 1000 MHz  
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
129.000000	44.20	41.77	43.50	-1.73	H	1.2	220	Pass
131.250000	43.83	41.75	43.50	-1.75	H	1.5	130	
147.000000	35.41	32.67	43.50	-10.83	V	1.5	30	
172.071250	37.69	35.74	43.50	-7.76	H	1.2	208	
258.056500	35.92	35.03	46.00	-10.97	H	1.5	115	
516.157500	37.01	35.58	46.00	-10.42	H	2.0	142	

TEST SITE: SEMI ANECHOIC CHAMBER  
TEST DISTANCE: 3 m  
DETECTORS USED: PEAK / AVERAGE  
FREQUENCY RANGE: 1000 MHz – 6500 MHz  
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
No spurious were found								Pass

\*- Margin = Measured emission - specification limit.

\*\*- EUT front panel refer to 0 degrees position of turntable.

## Reference numbers of test equipment used

HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604	HL 1947	HL 2009
HL 2432							

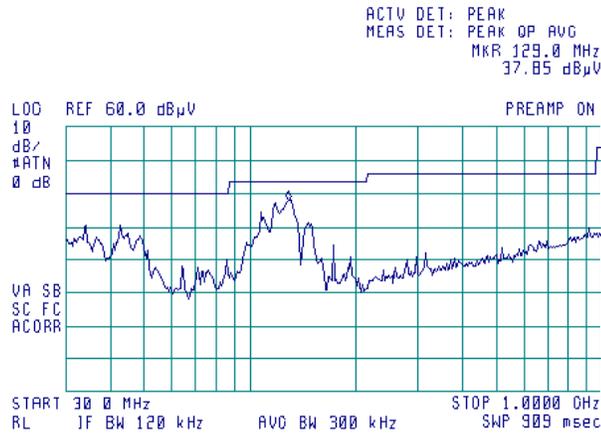
Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 15.109, Radiated emission</b>		
<b>Test procedure:</b>	ANSI C63.4, Sections 11.6 and 12.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	7/4/2006 3:00:29 PM		
<b>Temperature:</b> 24°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

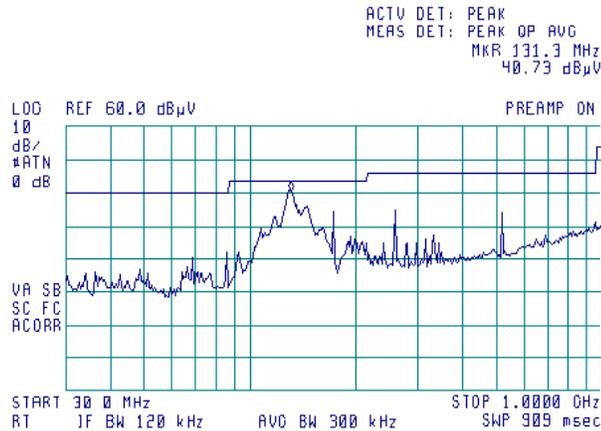
Plot 9.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE: Semi anechoic chamber  
LIMIT: Class B  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by



Plot 9.2.2 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization

TEST SITE: Semi anechoic chamber  
LIMIT: Class B  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by

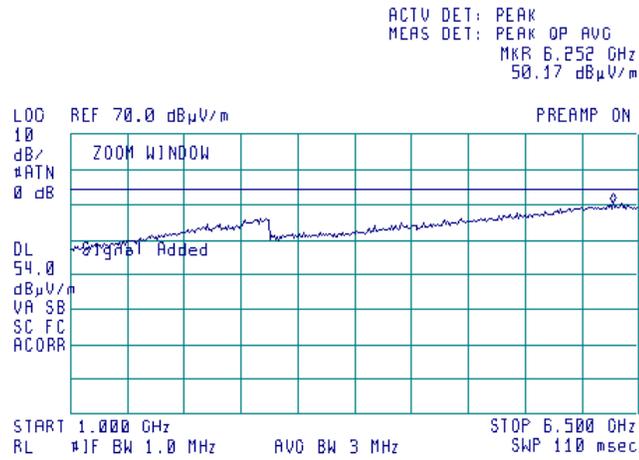




<b>Test specification:</b>		<b>Section 15.109, Radiated emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Sections 11.6 and 12.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	7/4/2006 3:00:29 PM		
<b>Temperature:</b> 24°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 48 %	<b>Power Supply:</b> 12 VDC
<b>Remarks:</b>			

**Plot 9.2.3 Radiated emission measurements above 1000 MHz, vertical & horizontal antenna polarization**

TEST SITE: Semi anechoic chamber  
LIMIT: Class B  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by





HERMON LABORATORIES

**10 APPENDIX A Test equipment and ancillaries used for tests**

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0032	Antenna, Biconical, 20 - 200 MHz	Electro-Metrics	BIA 25/30	3577	10-Jan-07	10-Jan-08
0038	Antenna Mast, 1-4 meter	HL	AM - 1	028	02-Feb-07	02-Feb-08
0091	Position Controller, for Antenna Mast + Turn Table, OFTS	HL	CRL-2	032	20-Apr-07	20-Apr-08
0163	LISN FCC/VDE/50 Ohm/50 uH + 5 Ohm, MIL-STD-461E, CISPR 16-1	Electro-Metrics	ANS 25/2	1314	01-Oct-07	01-Oct-08
0287	Turntable, Motorized Diameter, 2 m (OATS)	HL	TMD-2	042	11-Nov-06	11-Nov-07
0337	Probe Set, Hand held, 5 probes	Electro-Metrics	EHFP-30	238	08-Jun-07	08-Jun-08
0415	Cable, Coax, RF, RG-214	HL	CC-3	056	02-Dec-06	02-Dec-07
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	28-Jun-07	28-Jun-08
0465	Anechoic Chamber 9(L) x 6.5(W) x 5.5(H) m	HL	AC - 1	023	23-Aug-05	23-Aug-08
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	28-Aug-07	28-Aug-08
0566	Antenna, Biconical, 20 - 200 MHz	Electro-Metrics	BIA 25/30	3566	10-Jan-07	10-Jan-08
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-06	02-Dec-07
0592	Position Controller	HL	L2-SR3000 (HL CRL-3)	100	18-May-07	18-May-08
0593	Antenna Mast, 1-4 m Pneumatic	Madgesh	AM-F1	101	02-Feb-07	02-Feb-08
0594	Turn Table FOR ANECHOIC CHAMBER flush mount d=1.2 m Pneumatic	HL	TT-WDC1	102	08-Oct-07	08-Oct-08
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-07	10-Jan-08
0758	Power supply, dual, 36 V, 1 A	Horizon Electronics	DHR 36-1	5361231	26-Jun-07	26-Jun-08
0773	Power Supply, DC 0-36 V, 48 A	NEMIC-LAMBDA	DC36-48	B66635	05-Dec-06	05-Dec-07
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard Co	11947A	3107A018 77	21-Nov-06	21-Nov-07
0812	Cable Coax, RG-214, 11.5 m, N-type connectors	HL	C214-11	148	02-Dec-06	02-Dec-07
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	28-Aug-07	28-Aug-08
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A002 22, 3705A002 04	31-Aug-07	31-Aug-08
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	31-Aug-07	31-Aug-08
1502	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1502	16-Nov-07	16-Nov-08
1508	Cable RF, 2 m, BNC/BNC	Telequis	RG-58 C/U	1508	01-Jan-07	01-Jan-08
1510	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1510	01-Jan-07	01-Jan-08
1513	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1513	11-Sep-07	11-Sep-08
1553	Cable RF, 3.5 m	Alpha Wire	RG-214	1553	22-May-07	22-May-08



HERMON LABORATORIES

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
1562	Oscilloscope 100 MHz, DMM	Tektronix	THS720A	B039444	20-Sep-07	20-Sep-08
1566	Cable RF, 2 m	Huber-Suhner	Sucoflex 104PE	13094/4PE	02-Dec-06	02-Dec-07
1653	Analyzer EMC 9 kHz - 1.5 GHz	Agilent Technologies	E7401A	US39440281	01-Jan-07	01-Jan-08
1849	Antenna mast with polarity control (Small Anechoic chamber)	Sh. I. Machines	AM-F4	1849	19-Jan-07	19-Jan-08
1850	Turntable	Sh. I. Machines	TT-M-3	1850	11-Nov-06	11-Nov-07
1942	Cable 18 GHz, 4 m, blue	Rhophase Microwave Limited	SPS-1803A-4000-NPS	T4658	01-Jan-07	01-Jan-08
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	05-Oct-07	05-Oct-08
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	03-Mar-07	03-Mar-08
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	20-May-07	20-May-08
2109	Anechoic Chamber 6(L) x 5.5(W) x 2.95(H) m	HL	AC-2	2109	11-Nov-06	11-Nov-07
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	17-Jun-07	17-Jun-08
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0223	05-Nov-06	05-Nov-07
2358	Power Supply, 2 X 0-36VDC / 5A, 5VDC / 5A	Horizon Electronics	DHR3655 D	767469	07-Apr-07	07-Apr-08
2400	Cable 40GHz, 1.5 m, green	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2946	01-Jan-07	01-Jan-08
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-07	03-Mar-08
2483	Detector 0.001-12 GHz	HP	36-51	2483	14-Oct-07	14-Oct-08
2634	Power Supply, 0-36.0 VDC, 0-12.0 A	NEMIC-LAMBDA	UP36-12	2634	29-Aug-07	29-Aug-08
2697	Antenna, 30 MHz - 3.0 GHz	Sunol Sciences. Corp. Pleasanton, California USA	JB3	A022805	10-Jan-07	10-Jan-08
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY4510246	11-Jun-07	11-Jun-08
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155-00	2871	11-Feb-07	11-Feb-08
2875	Power meter RF	Boonton Electronics Corp.	42220A	341703AC	21-Feb-07	21-Feb-08
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539001	11-Feb-07	11-Feb-08
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY41444762	07-May-07	07-May-08
3176	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	0708	07-May-07	07-May-08
3179	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N20W5+	0651	07-May-07	07-May-08
3181	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N20W5+	0651	07-May-07	07-May-08



**11 APPENDIX B Measurement uncertainties**

**Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements**

Test description	Expanded uncertainty
<b>Transmitter tests</b>	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Transient frequency behaviour	187 Hz ± 13.9 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
<b>Unintentional radiator tests</b>	
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization  Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.



HERMON LABORATORIES

## 12 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

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## 13 APPENDIX D Specification references

47CFR part 90: 2006	Private land mobile radio services
47CFR part 15: 2006	Radio frequency devices
47CFR part 1: 2006	Practice and procedure
47CFR part 2: 2006	Frequency allocations and radio treaty matters; general rules and regulations
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI/TIA/EIA-603-A:2001	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards



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## 14 APPENDIX E Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB( $\mu$ V)	decibel referred to one microvolt
dB( $\mu$ V/m)	decibel referred to one microvolt per meter
dB( $\mu$ A)	decibel referred to one microampere
dB $\Omega$	decibel referred to one Ohm
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
ITE	information technology equipment
k	kilo
kHz	kilohertz
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
$\mu$ s	microsecond
NA	not applicable
NB	narrow band
NT	not tested
OATS	open area test site
$\Omega$	Ohm
QP	quasi-peak
PCB	printed circuit board
PM	pulse modulation
PS	power supply
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere



**15 APPENDIX F Test equipment correction factors**

**Antenna factor**  
**Active Loop Antenna**  
**EMC Test Systems, model 6502, serial number 2857, HL 0446**

Frequency, MHz	Magnetic Antenna Factor, dB(S/m)	Electric Antenna Factor, dB(1/m)
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.7
0.750	-41.9	9.6
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.1
4.000	-41.4	10.1
5.000	-41.5	10.0
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(S/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ A/m).  
Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).

**Antenna factor**  
**Biconical antenna**  
**Electro-Metrics, model BIA-25/30**  
**Ser.No.3577, HL 0032**

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
20	15.1	115	16.7
25	14.6	120	14.1
30	13.7	125	13.1
35	11.8	130	13.0
40	11.4	135	12.9
45	11.7	140	12.7
50	11.4	145	12.5
55	10.5	150	14.3
60	10.3	155	14.8
65	8.9	160	14.7
70	7.6	165	15.1
75	7.3	170	15.6
80	7.3	175	16.5
85	7.8	180	16.7
90	9.4	185	17.3
95	10.6	190	17.9
100	11.8	195	17.6
105	12.5	200	17.9
110	13.7		

Antenna factor in dB (1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).



**Antenna factor  
Biconical antenna  
Electro-Metrics, model BIA-25/30  
Ser.No.3566, HL 0566**

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
30	14.7	120	16.8
35	12.9	125	15.5
40	12.6	130	15.5
45	12.8	135	15.1
50	12.6	140	14.8
55	11.8	145	15.1
60	11.7	150	16.9
65	10.4	155	17.2
70	9.2	160	17.3
75	9.1	165	17.8
80	9.1	170	18.3
85	9.5	175	19.0
90	11.2	180	19.5
95	12.6	185	20.0
100	13.7	190	20.4
105	14.2	195	20.5
110	15.3	200	20.6
115	17.1		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

**Antenna factor  
Log periodic antenna  
Electro-Metrics, model LPA-25/30  
Ser.No.1953, HL 0569**

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	15.2	625	25.2
225	15.1	650	25.8
250	16.3	675	27.2
275	17.2	700	27.6
300	19.6	725	27.6
325	18.4	750	27.6
350	19.0	775	28.0
375	20.0	800	28.2
400	20.9	825	29.4
425	21.3	850	29.9
450	22.1	875	30.0
475	22.7	900	30.4
500	23.2	925	30.6
525	23.9	950	30.8
550	24.2	975	31.6
575	24.6	1000	32.1
600	24.7		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).



**Antenna factor**  
**Biconilog antenna EMCO, model 3141, serial number 1011, HL 0604**

Frequency, MHz	Antenna factor, dB(1/m)	Frequency, MHz	Antenna factor, dB(1/m)	Frequency, MHz	Antenna factor, dB(1/m)
26	7.8	560	19.8	1300	27.0
28	7.8	580	20.6	1320	27.8
30	7.8	600	21.3	1340	28.3
40	7.2	620	21.5	1360	28.2
60	7.1	640	21.2	1380	27.9
70	8.5	660	21.4	1400	27.9
80	9.4	680	21.9	1420	27.9
90	9.8	700	22.2	1440	27.8
100	9.7	720	22.2	1460	27.8
110	9.3	740	22.1	1480	28.0
120	8.8	760	22.3	1500	28.5
130	8.7	780	22.6	1520	28.9
140	9.2	800	22.7	1540	29.6
150	9.8	820	22.9	1560	29.8
160	10.2	840	23.1	1580	29.6
170	10.4	860	23.4	1600	29.5
180	10.4	880	23.8	1620	29.3
190	10.3	900	24.1	1640	29.2
200	10.6	920	24.1	1660	29.4
220	11.6	940	24.0	1680	29.6
240	12.4	960	24.1	1700	29.8
260	12.8	980	24.5	1720	30.3
280	13.7	1000	24.9	1740	30.8
300	14.7	1020	25.0	1760	31.1
320	15.2	1040	25.2	1780	31.0
340	15.4	1060	25.4	1800	30.9
360	16.1	1080	25.6	1820	30.7
380	16.4	1100	25.7	1840	30.6
400	16.6	1120	26.0	1860	30.6
420	16.7	1140	26.4	1880	30.6
440	17.0	1160	27.0	1900	30.6
460	17.7	1180	27.0	1920	30.7
480	18.1	1200	26.7	1940	30.9
500	18.5	1220	26.5	1960	31.2
520	19.1	1240	26.5	1980	31.6
540	19.5	1260	26.5	2000	32.0
		1280	26.6		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).



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**Antenna factor**  
**Double-ridged wave guide horn antenna**  
**EMC Test Systems, model 3115, serial no: 9911-5964, HL 1984**

Frequency, MHz	Antenna gain, dBi	Antenna factor. dB(1/m)
1000.0	5.8	24.5
1500.0	9.0	24.8
2000.0	8.6	27.7
2500.0	9.5	28.7
3000.0	8.9	30.8
3500.0	8.2	32.9
4000.0	9.6	32.7
4500.0	11.2	32.1
5000.0	10.6	33.6
5500.0	9.8	35.3
6000.0	10.1	35.7
6500.0	10.7	35.8
7000.0	10.9	36.2
7500.0	10.5	37.2
8000.0	11.1	37.2
8500.0	10.8	38.1
9000.0	10.7	38.6
9500.0	11.5	38.3
10000.0	11.8	38.4
10500.0	12.3	38.3
11000.0	12.3	38.8
11500.0	11.5	39.9
12000.0	12.2	39.6
12500.0	12.6	39.5
13000.0	12.0	40.5
13500.0	11.7	41.1
14000.0	11.7	41.5
14500.0	12.7	40.8
15000.0	14.2	39.5
15500.0	16.0	38.1
16000.0	16.2	38.1
16500.0	14.5	40.1
17000.0	12.2	42.6
17500.0	9.7	45.4
18000.0	6.6	48.7

Antenna factor is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).

**Antenna factor**  
**Double-ridged guide horn antenna**  
**Model 3115, serial number: 00027177, HL2432**

Frequency, MHz	Antenna factor. dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.8
2500.0	28.9
3000.0	30.7
3500.0	31.8
4000.0	33.0
4500.0	32.8
5000.0	34.2
5500.0	34.9
6000.0	35.2
6500.0	35.4
7000.0	36.3
7500.0	37.3
8000.0	37.5
8500.0	38.0
9000.0	38.3
9500.0	38.3
10000.0	38.7
10500.0	38.7
11000.0	38.9
11500.0	39.5
12000.0	39.5
12500.0	39.4
13000.0	40.5
13500.0	40.8
14000.0	41.5
14500.0	41.3
15000.0	40.2
15500.0	38.7
16000.0	38.5
16500.0	39.8
17000.0	41.9
17500.0	45.8
18000.0	49.1

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).



Antenna calibration  
Sunol Sciences Inc., model JB3, serial number A022805

Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain
30	22.2	-22.5	0.01	620	19.7	6.3	4.27	1215	24.9	7.0	5.05	1810	28.3	7.1	5.08	2405	30.9	6.9	4.93
35	18.5	-17.4	0.02	625	19.7	6.5	4.42	1220	24.9	7.0	4.99	1815	28.5	6.9	4.91	2410	30.9	6.9	4.89
40	14.7	-12.5	0.06	630	19.6	6.6	4.57	1225	25.1	6.9	4.91	1820	28.6	6.8	4.74	2415	31.0	6.9	4.85
45	11.3	-8.1	0.16	635	19.7	6.5	4.48	1230	25.2	6.8	4.82	1825	28.7	6.8	4.76	2420	31.0	6.8	4.82
45	11.3	-8.1	0.16	640	19.9	6.4	4.40	1235	25.1	7.0	4.96	1830	28.7	6.8	4.76	2425	31.1	6.8	4.81
50	8.9	-4.7	0.34	645	19.9	6.5	4.45	1240	25.0	7.1	5.09	1835	28.7	6.7	4.72	2430	31.0	6.9	4.87
55	7.9	-2.8	0.52	650	19.9	6.5	4.51	1245	25.0	7.1	5.12	1840	28.8	6.7	4.69	2435	31.0	6.9	4.88
60	7.8	-2.1	0.62	655	19.9	6.6	4.60	1250	25.0	7.1	5.15	1845	28.6	6.9	4.90	2440	31.2	6.8	4.74
70	9.0	0.04	0.64	665	19.9	6.7	4.70	1260	24.9	7.3	5.36	1855	28.5	7.0	5.07	2450	31.0	7.0	4.96
75	8.8	-1.1	0.78	670	20.0	6.7	4.71	1265	25.0	7.3	5.31	1860	28.6	7.0	5.01	2455	31.0	7.0	5.01
80	8.4	-0.2	0.97	675	20.1	6.7	4.71	1270	25.1	7.2	5.26	1865	28.5	7.1	5.17	2460	30.9	7.2	5.19
85	8.0	0.8	1.20	680	20.1	6.7	4.71	1275	25.3	7.0	5.05	1870	28.4	7.3	5.33	2465	31.1	6.9	4.95
90	8.2	1.7	1.29	685	20.1	6.8	4.78	1280	25.5	6.8	4.84	1875	28.4	7.2	5.28	2470	31.3	6.8	4.76
95	9.2	0.5	1.13	690	20.1	6.9	4.88	1285	25.4	7.0	4.97	1880	28.5	7.2	5.22	2475	31.4	6.7	4.69
100	10.6	-0.4	0.92	695	20.2	6.8	4.82	1290	25.3	7.1	5.10	1885	28.5	7.2	5.22	2480	31.3	6.8	4.79
105	11.7	-1.1	0.78	700	20.3	6.8	4.76	1295	25.3	7.2	5.22	1890	28.6	7.2	5.21	2485	31.1	7.0	5.00
110	12.6	-1.6	0.70	705	20.4	6.8	4.75	1300	25.2	7.3	5.33	1895	28.6	7.2	5.24	2490	31.1	7.0	4.99
115	13.3	-1.9	0.65	710	20.5	6.8	4.75	1305	25.3	7.2	5.21	1900	28.6	7.2	5.27	2495	31.2	7.0	4.99
120	13.9	-2.1	0.62	715	20.5	6.8	4.80	1310	25.5	7.1	5.09	1905	28.5	7.3	5.36	2500	30.9	7.2	5.27
125	14.2	-2.0	0.63	720	20.5	6.9	4.85	1315	25.4	7.2	5.23	1910	28.5	7.4	5.45	2505	31.1	7.1	5.15
130	14.2	-1.7	0.68	725	20.6	6.8	4.81	1320	25.3	7.3	5.36	1915	28.5	7.3	5.38	2510	31.0	7.2	5.22
135	13.8	-1.0	0.79	730	20.7	6.8	4.77	1325	25.5	7.2	5.21	1920	28.6	7.3	5.31	2515	31.0	7.2	5.26
140	13.4	-0.3	0.84	735	20.9	6.7	4.65	1330	25.6	7.0	5.08	1925	28.6	7.3	5.35	2520	31.0	7.0	5.05
145	13.1	0.8	1.08	740	21.0	6.8	4.53	1335	25.7	7.0	5.07	1930	28.5	7.3	5.38	2525	30.8	7.4	5.54
150	12.9	0.8	1.21	745	21.0	6.6	4.59	1340	25.7	7.1	5.09	1935	28.5	7.4	5.54	2530	31.0	7.3	5.37
155	12.7	1.3	1.34	750	21.0	6.7	4.64	1345	25.7	7.1	5.13	1940	28.4	7.6	6.70	2535	31.2	7.0	5.06
160	12.7	1.6	1.44	755	21.0	6.8	4.74	1350	25.9	7.1	5.17	1945	28.5	7.5	5.69	2540	31.2	7.1	5.09
170	12.2	2.6	1.83	765	21.1	6.8	4.73	1360	25.7	6.9	4.95	1955	28.6	7.5	5.57	2550	31.0	7.3	5.38
175	11.5	3.3	2.13	770	21.1	6.8	4.64	1370	26.3	7.1	5.14	1965	28.5	7.4	5.65	2555	30.8	7.4	5.45
180	11.6	3.7	2.36	775	21.3	6.7	4.68	1370	26.0	7.0	4.96	1965	28.7	7.4	5.47	2560	31.0	7.4	5.47
185	11.5	4.0	2.54	780	21.3	6.7	4.72	1375	26.0	7.0	5.01	1970	28.9	7.2	5.29	2565	30.8	7.6	5.70
190	11.6	4.2	2.61	785	21.3	6.8	4.77	1380	26.0	7.0	5.06	1975	28.9	7.2	5.22	2570	31.1	7.3	5.37
195	12.1	3.9	2.47	790	21.3	6.8	4.82	1385	26.0	7.0	4.99	1980	29.0	7.1	5.16	2575	31.5	7.0	4.96
200	13.0	3.2	2.07	795	21.4	6.9	4.79	1390	26.1	6.9	4.92	1985	29.1	7.0	5.11	2580	31.6	6.9	4.92
205	12.0	4.4	2.76	800	21.5	6.8	4.77	1395	26.2	6.9	4.94	1990	29.1	7.0	5.06	2585	31.6	6.8	4.79
210	11.0	5.6	3.66	805	21.6	6.7	4.71	1400	26.2	7.0	4.96	1995	29.1	7.1	5.09	2590	31.6	6.9	4.88
215	11.3	5.6	3.59	810	21.7	6.7	4.65	1405	26.1	7.0	5.02	2000	29.1	7.1	5.11	2595	31.5	7.0	4.97
220	11.6	5.5	3.52	815	21.7	6.7	4.71	1410	26.1	7.1	5.09	2005	29.1	7.1	5.16	2600	31.6	6.9	4.86
225	11.7	5.5	3.55	820	21.7	6.8	4.80	1415	26.2	7.0	5.02	2010	29.1	7.1	5.15	2605	31.3	7.2	5.30
230	11.9	5.6	3.57	825	21.7	6.8	4.82	1420	26.3	7.0	4.98	2015	29.2	7.1	5.13	2610	31.4	7.1	5.15
235	12.1	5.5	3.56	830	21.7	6.9	4.85	1425	26.2	7.1	5.10	2020	29.2	7.1	5.18	2615	31.7	6.9	4.88
240	12.3	5.5	3.54	835	21.8	6.8	4.82	1430	26.1	7.2	5.25	2025	29.3	7.1	5.08	2620	31.6	7.0	4.97
245	12.3	5.7	3.71	840	21.9	6.8	4.80	1435	26.1	7.2	5.24	2030	29.3	7.0	5.05	2625	31.4	7.1	5.17
250	12.3	5.9	3.88	845	21.9	6.8	4.83	1440	26.2	7.2	5.24	2035	29.3	7.1	5.07	2630	31.6	7.0	5.00
255	12.5	5.9	3.85	850	21.9	6.9	4.86	1445	26.3	7.1	5.11	2040	29.3	7.1	5.13	2635	31.8	6.8	4.82
260	12.7	5.8	3.83	855	22.0	6.9	4.80	1450	26.5	7.0	5.23	2045	29.2	7.2	5.23	2640	31.7	7.0	4.98
265	13.2	5.5	3.54	860	22.1	6.8	4.74	1455	26.4	7.1	5.07	2050	29.2	7.2	5.27	2645	31.7	6.9	4.93
270	13.7	5.2	3.27	865	22.0	6.9	4.92	1460	26.4	7.1	5.17	2055	29.3	7.2	5.21	2650	31.8	6.9	4.85
275	13.7	5.3	3.39	870	21.9	7.1	5.11	1465	26.4	7.2	5.19	2060	29.5	7.0	5.02	2655	31.8	6.9	4.85
280	13.7	5.4	3.50	875	22.0	7.1	5.08	1470	26.4	7.2	5.22	2065	29.4	7.1	5.08	2660	31.7	7.0	5.02
285	13.7	5.6	3.61	880	22.1	7.0	5.05	1475	26.4	7.1	5.17	2070	29.4	7.1	5.10	2665	32.0	6.7	4.71
290	13.7	5.7	3.72	885	22.1	7.0	5.06	1480	26.5	7.1	5.13	2075	29.4	7.1	5.11	2670	32.0	6.7	4.67
295	13.8	5.8	3.77	890	22.1	7.0	5.06	1485	26.5	7.1	5.14	2080	29.8	6.8	4.78	2675	31.9	6.8	4.81
300	13.9	5.8	3.81	895	22.2	7.1	5.09	1490	26.5	7.1	5.17	2085	29.7	6.9	4.89	2680	31.7	7.0	5.04
305	14.0	5.9	3.85	900	22.2	7.1	5.12	1495	26.5	7.2	5.24	2090	29.7	6.9	4.86	2685	31.9	6.8	4.83
310	14.1	5.9	3.88	905	22.3	7.1	5.09	1500	26.5	7.2	5.31	2095	29.8	6.8	4.78	2690	32.1	6.7	4.72
315	14.3	5.9	3.89	910	22.3	7.0	5.05	1505	26.5	7.2	5.27	2100	29.9	6.8	4.75	2695	32.1	6.7	4.71
320	14.4	5.9	3.90	915	22.4	7.0	4.99	1510	26.6	7.0	5.23	2105	29.8	6.8	4.81	2700	32.0	6.8	4.81
325	14.5	5.9	3.92	920	22.6	6.9	4.92	1515	26.6	7.2	5.30	2110	29.9	6.8	4.78	2705	32.0	6.8	4.80
330	14.6	5.9	3.93	925	22.7	6.9	4.85	1520	26.5	7.3	5.38	2115	29.9	6.8	4.76	2710	32.1	6.8	4.79
340	14.7	6.2	4.12	935	22.8	6.8	4.83	1530	26.6	7.3	5.36	2125	29.9	6.9	4.89	2720	32.4	6.5	4.47
345	14.9	6.1	4.06	940	22.8	6.9	4.89	1535	26.6	7.4	5.44	2130	29.9	6.9	4.89	2725	32.2	6.7	4.63
350	15.1	6.0	3.99	945	22.8	6.9	4.87	1540	26.5	7.4	5.53	2135	29.8	6.9	4.94	2730	31.9	7.0	5.05
360	15.6	5.8	3.78	955	23.0	6.8	4.81	1550	26.5	7.5	5.63	2145	29.9	6.8	4.92	2740	31.6	7.1	5.16
365	15.4	5.9	3.89	960	23.1	6.8	4.77	1555	26.7	7.3	5.39	2150	29.9	7.0	4.98	2745	31.9	7.0	5.06
370	15.5	6.0	4.01	965	23.1	6.7	4.73	1560	26.9	7.1	5.16	2155	29.8	7.1	5.10	2750	32.0	6.8	4.84
375	15.6	6.1	4.03	970	23.2	6.7	4.69	1565	26.9	7.2	5.23	2160	29.8	7.1	5.09	2755	32.0	7.0	4.98
380	15.7	6.1	4.05	975	23.3	6.6	4.6												



HERMON LABORATORIES

**Cable loss**  
**Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, HL 0589**  
**+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, HL 1004**

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	30	0.33	≤ 6.5	±0.12
2	50	0.40		
3	100	0.57		
4	300	0.97		
5	500	1.25		
6	800	1.59		
7	1000	1.81		
8	1200	1.97		
9	1400	2.15		
10	1600	2.28		
11	1800	2.43		
12	2000	2.61		
13	2200	2.75		
14	2400	2.89		
15	2600	2.97		
16	2800	3.21	≤ 6.5	±0.12
17	3000	3.32		
18	3300	3.47		
19	3600	3.62		
20	3900	3.84		
21	4200	3.92		
22	4500	4.07		
23	4800	4.36		±0.17
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		



HERMON LABORATORIES

**Cable loss**  
**Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1502**

Frequency, MHz	Cable loss, dB
0.1	0.02
1	0.07
3	0.15
5	0.17
10	0.26
30	0.43
50	0.57
80	0.72
100	0.81
300	1.48
500	2.00
800	2.70
1000	3.09

**Cable loss**  
**Cable M17/167 MIL-C-17, HL 1510**

No.	Frequency, MHz	Cable loss, dB
1	0.1	0.05
2	1	0.09
3	3	0.16
4	5	0.18
5	10	0.27
6	30	0.44
7	50	0.58
8	80	0.69
9	100	0.82
10	300	1.48
11	500	2.01
12	800	2.65
13	1000	3.12



HERMON LABORATORIES

**Cable loss**  
**RF cable 3.5 m, Alpha Wire, model RG-214, S/N 149, HL 1553**

No.	Frequency, MHz	Cable loss, dB	Measurement uncertainty, dB
1	1	0.01	±0.05
2	10	0.07	
3	30	0.12	
4	50	0.22	
5	100	0.26	
6	200	0.40	
7	300	0.52	
8	400	0.60	
9	500	0.70	
10	600	0.77	
11	700	0.84	
12	800	1.00	
13	900	1.00	
14	1000	1.05	
15	2000	1.70	

**Cable loss**  
**Cable Coaxial, RG-58/RG-214, s/n 056, HL 0415**  
**+ Cable Coaxial, RG-214, 11.5m, s/n 148, HL 0812**

No.	Frequency, MHz	Cable loss, dB	Measured uncertainty, dB
1	20	0.73	±0.12
2	30	0.91	
3	50	1.2	
4	80	1.56	
5	100	1.76	
6	200	2.59	
7	300	3.26	
8	400	3.93	
9	500	4.42	
10	600	4.92	
11	700	5.36	
12	800	5.88	
13	900	6.41	
14	1000	6.71	
15	1500	8.63	
16	2000	10.39	



HERMON LABORATORIES

**Cable loss**  
**Cable RF, 2m, model: Sucoflex 104PE, S/N 13094/4PE, HL 1566**

No.	Frequency, MHz	Cable loss, dB	Tolerance, dB	Measurement uncertainty, dB
1	30	0.10	≤ 5.0	±0.12
2	50	0.13		
3	100	0.20		
4	300	0.33		
5	500	0.45		
6	800	0.60		
7	1000	0.65		
8	1500	0.91		
9	2000	1.08		
10	2500	1.19		
11	3000	1.28		
12	3500	1.49		
13	4000	1.63		
14	4500	1.63	≤ 5.0	±0.17
15	5000	1.66		
16	5500	1.88		
17	6000	1.96		
18	6500	1.93		
19	7000	2.07		
20	7500	2.37		
21	8000	2.34		
22	8500	2.64		
23	9000	2.68		
24	9500	2.64		
25	10000	2.70		
26	10500	2.84		
27	11000	2.88	≤ 5.0	±0.26
28	11500	3.19		
29	12000	3.15		
30	12500	3.20		
31	13000	3.22		
32	13500	3.47		
33	14000	3.41		
34	14500	3.59		
35	15000	3.79		
36	15500	4.24		
37	16000	4.12		
38	16500	4.46		
39	17000	4.50		
40	17500	4.49		
41	18000	4.45		



HERMON LABORATORIES

**Cable loss**  
**Cable 18 GHz, 4 m, blue, model: SPS-1803A-4000-NPS, S/N T4658, HL 1942**

Frequency, GHz	Cable loss, dB
0.03	0.21
0.05	0.26
0.10	0.36
0.20	0.50
0.30	0.61
0.40	0.70
0.50	0.78
0.60	0.85
0.70	0.93
0.80	0.99
0.90	1.04
1.00	1.10
1.10	1.16
1.20	1.22
1.30	1.26
1.40	1.31
1.50	1.35
1.60	1.41
1.70	1.45
1.80	1.49
1.90	1.53
2.00	1.57
2.10	1.61
2.20	1.65
2.30	1.69
2.40	1.72
2.50	1.76
2.60	1.79
2.70	1.83
2.80	1.87
2.90	1.90
3.10	1.97
3.30	2.04
3.50	2.11
3.70	2.18
3.90	2.24
4.10	2.31
4.30	2.38
4.50	2.43
4.70	2.53
4.90	2.53
5.10	2.63
5.30	2.65
5.50	2.72
5.70	2.76
5.90	2.79

Frequency, GHz	Cable loss, dB
6.10	2.88
6.30	2.90
6.50	2.97
6.70	3.02
6.90	3.04
7.10	3.07
7.30	3.12
7.50	3.13
7.70	3.19
7.90	3.24
8.10	3.30
8.30	3.36
8.50	3.45
8.70	3.41
8.90	3.45
9.10	3.42
9.30	3.55
9.50	3.48
9.70	3.58
9.90	3.61
10.10	3.66
10.30	3.68
10.50	3.70
10.70	3.70
10.90	3.75
11.10	3.78
11.30	3.86
11.50	3.98
11.70	4.10
11.90	4.12
12.10	4.09
12.40	4.13
13.00	4.23
13.50	4.35
14.00	4.40
14.50	4.44
15.00	4.57
15.50	4.66
16.00	4.64
16.50	4.66
17.00	4.75
17.50	4.85
18.00	4.93



HERMON LABORATORIES

**Cable loss**  
**Cable 18 GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, S/N T4974, HL 1947**

Frequency, GHz	Cable loss, dB
0.03	0.30
0.05	0.38
0.10	0.53
0.20	0.74
0.30	0.91
0.40	1.05
0.50	1.18
0.60	1.29
0.70	1.40
0.80	1.50
0.90	1.59
1.00	1.68
1.10	1.77
1.20	1.86
1.30	1.94
1.40	2.01
1.50	2.08
1.60	2.16
1.70	2.22
1.80	2.29
1.90	2.36
2.00	2.42
2.10	2.48
2.20	2.54
2.30	2.60
2.40	2.66
2.50	2.71
2.60	2.77
2.70	2.83
2.80	2.89
2.90	2.95
3.10	3.06
3.30	3.17
3.50	3.28
3.70	3.39
3.90	3.51
4.10	3.62
4.30	3.76
4.50	3.87
4.70	4.01
4.90	4.10
5.10	4.21
5.30	4.31
5.50	4.43
5.70	4.56
5.90	4.71

Frequency, GHz	Cable loss, dB
6.10	4.87
6.30	4.95
6.50	4.94
6.70	4.88
6.90	4.87
7.10	4.83
7.30	4.85
7.50	4.86
7.70	4.91
7.90	4.96
8.10	5.03
8.30	5.08
8.50	5.13
8.70	5.21
8.90	5.22
9.10	5.34
9.30	5.35
9.50	5.52
9.70	5.51
9.90	5.66
10.10	5.70
10.30	5.78
10.50	5.79
10.70	5.82
10.90	5.86
11.10	5.94
11.30	6.06
11.50	6.21
11.70	6.44
11.90	6.61
12.10	6.76
12.40	6.68
13.00	6.66
13.50	6.81
14.00	6.90
14.50	6.90
15.00	6.97
15.50	7.17
16.00	7.28
16.50	7.27
17.00	7.38
17.50	7.68
18.00	7.92



**Cable loss**  
**RF cable 8 m, model RG-214, HL 2009**

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	1	0.10	NA	±0.12
2	10	0.14		
3	30	0.25		
4	50	0.34		
5	100	0.53		
6	300	0.99		
7	500	1.31		
8	800	1.73		
9	1000	1.98		
10	1100	2.11		
11	1200	2.21		
12	1300	2.35		
13	1400	2.46		
14	1500	2.55		
15	1600	2.68		
16	1700	2.78		
17	1800	2.88		
18	1900	2.98		
19	2000	3.09		



**Cable loss**  
**Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.04	5.10	0.80	15.00	1.49
0.05	0.07	5.30	0.83	15.50	1.49
0.10	0.09	5.50	0.83	16.00	1.46
0.20	0.15	5.70	0.84	16.50	1.47
0.30	0.19	5.90	0.87	17.00	1.50
0.40	0.25	6.10	0.86	17.50	1.57
0.50	0.29	6.30	0.89	18.00	1.63
0.60	0.33	6.50	0.90	18.50	1.57
0.70	0.37	6.70	0.89	19.00	1.63
0.80	0.41	6.90	0.93	19.50	1.65
0.90	0.44	7.10	0.92	20.00	1.64
1.00	0.45	7.30	0.95	20.50	1.75
1.10	0.48	7.50	0.96	21.00	1.72
1.20	0.51	7.70	0.97	21.50	1.78
1.30	0.53	7.90	1.01	22.00	1.76
1.40	0.54	8.10	1.00	22.50	1.72
1.50	0.57	8.30	1.05	23.00	1.83
1.60	0.59	8.50	1.04	23.50	1.80
1.70	0.04	8.70	1.07	24.00	1.90
1.80	0.07	8.90	1.11	24.50	1.81
1.90	0.09	9.10	1.09	25.00	1.98
2.00	0.15	9.30	1.14	25.50	1.91
2.10	0.19	9.50	1.12	26.00	2.02
2.20	0.25	9.70	1.15	26.50	1.92
2.30	0.29	9.90	1.16	27.00	1.97
2.40	0.33	10.10	1.16	28.00	2.02
2.50	0.37	10.30	1.19	29.00	1.95
2.60	0.41	10.50	1.14	30.00	1.94
2.70	0.44	10.70	1.19	31.00	2.11
2.80	0.45	10.90	1.17	32.00	2.17
2.90	0.48	11.10	1.13	33.00	2.27
3.10	0.61	11.30	1.20	34.00	2.27
3.30	0.64	11.50	1.13	35.00	2.29
3.50	0.65	11.70	1.20	36.00	2.35
3.70	0.68	11.90	1.18	37.00	2.37
3.90	0.69	12.10	1.14	38.00	2.40
4.10	0.71	12.40	1.19	39.00	2.57
4.30	0.73	13.00	1.34	40.00	2.36
4.50	0.75	13.50	1.33		
4.70	0.77	14.00	1.48		
4.90	0.79	14.50	1.45		



HERMON LABORATORIES

**Cable loss**  
**Cable coaxial, 40GHz, 1.5 m, green, Rhophase Microwave Limited, model: KPS-1503A-1500-KPS, HL 2400**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.06	6.5	1.46	15.50	2.34
0.05	0.08	6.7	1.49	16.00	2.34
0.1	0.15	6.9	1.50	16.50	2.40
0.2	0.23	7.1	1.51	17.00	2.46
0.3	0.29	7.3	1.55	17.50	2.54
0.5	0.37	7.5	1.56	18.00	2.61
0.7	0.46	7.7	1.58	18.50	2.59
0.9	0.53	7.9	1.60	19.00	2.59
1.1	0.58	8.1	1.61	19.50	2.67
1.3	0.65	8.3	1.68	20.00	2.62
1.5	0.66	8.5	1.68	20.50	2.73
1.7	0.72	8.7	1.75	21.00	2.71
1.9	0.76	8.9	1.74	21.50	2.78
2.1	0.79	9.1	1.81	22.00	2.83
2.3	0.85	9.3	1.79	22.50	2.81
2.5	0.90	9.5	1.86	23.50	2.91
2.7	0.91	9.7	1.85	24.00	2.97
2.9	0.97	9.9	1.87	24.50	2.98
3.1	0.97	10.1	1.88	25.00	2.97
3.3	1.03	10.30	1.82	25.50	3.03
3.5	1.06	10.50	1.92	26.00	3.04
3.7	1.10	10.70	1.86	26.50	3.11
3.9	1.13	10.90	1.96	27.00	2.97
4.1	1.16	11.10	1.90	28.00	3.15
4.3	1.18	11.30	1.99	29.00	3.07
4.5	1.21	11.50	1.95	30.00	3.13
4.7	1.23	11.70	2.00	31.00	3.13
4.9	1.26	11.90	2.01	32.00	3.18
5.1	1.28	12.10	1.99	33.00	3.31
5.3	1.31	12.40	2.06	34.00	3.32
5.5	1.32	13.00	2.11	35.00	3.37
5.7	1.36	13.50	2.17	36.00	3.36
5.9	1.37	14.00	2.36	37.00	3.46
6.1	1.38	14.50	2.32	39.00	3.49
6.3	1.44	15.00	2.30	40.00	3.52



HERMON LABORATORIES

**Cable loss**  
**Cable coaxial, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 001**  
**HL 2882**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
10	0.08	5750	1.78	12000	2.57
30	0.12	6000	1.84	12250	2.62
100	0.22	6250	1.87	12500	2.66
250	0.35	6500	1.92	12750	2.68
500	0.49	6750	1.96	13000	2.67
750	0.60	7000	2.01	13250	2.75
1000	0.68	7250	2.08	13500	2.77
1250	0.78	7500	2.12	13750	2.90
1500	0.85	7750	2.19	14000	3.00
1750	0.92	8000	2.22	14250	3.12
2000	0.98	8250	2.28	14500	2.98
2250	1.06	8500	2.29	14750	3.03
2500	1.11	8750	2.27	15000	2.99
2750	1.19	9000	2.28	15250	2.99
3000	1.25	9250	2.26	15500	2.98
3250	1.30	9500	2.29	15750	2.98
3500	1.34	9750	2.33	16000	2.99
3750	1.40	10000	2.34	16250	3.05
4000	1.45	10250	2.41	16500	3.11
4250	1.51	10500	2.46	16750	3.18
4500	1.54	10750	2.48	17000	3.23
4750	1.59	11000	2.48	17250	3.21
5000	1.63	11250	2.52	17500	3.22
5250	1.68	11500	2.53	17750	3.22
5500	1.72	11750	2.56	18000	3.25

**Annex 1 to the test report MOTRAD\_FCC.17112\_rev1**

**Modulation Characteristics and Necessary Bandwidth -- Pursuant 47 CFR 2.1033(c) 13, 2.1047(d) & 2.202**

6a.2.1 Digitally encoded digital data is transmitted in groups of four sub-channels at a 4 kHz rate using M-ary symbols mapped to predetermined fixed magnitude and phase components within 1 of 3 constellations associated with a particular modulation scheme. One to four groups of four sub-channel streams are combined using frequency division multiplexing to form the modulated waveform. Figure 6-3 illustrates symbol mapping to one of the four QPSK sub-channels constellations. Figure 6-4 illustrates symbol mapping to one of the four 16QAM sub-channels constellation. Figure 6-5 illustrates symbol mapping to one of the four 64QAM sub-channels constellation. For Quad-QPSK modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 4 points on the constellation. For Quad-16QAM modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 16 points on the constellation. For Quad-64 modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 64 points on the constellation.

The bandwidth of the modulating signals is limited by the pair of modulation limiting low pass filters within the modem block function of U801. These filters serve to limit out-of-band and spurious emissions due to modulation. The necessary bandwidth of the sub-channels is limited to 4.8 kHz by the pair of modulation limiting low pass filters. The transfer response of these filters is depicted in Figure 6-1 where the filter excess bandwidth coefficient of 0.2 is shown. This excess bandwidth leads to the necessary bandwidth calculation of  $(1 + 0.2) \times (4 \text{ kHz}) = 4.8 \text{ kHz}$ . Since the sub-channels are spaced 4.5 kHz apart, and the groups that each contain 4 sub-channels are spaced apart in integer multiples of 25 kHz, the necessary bandwidth of the composite 4 sub-channel symbol streams (single group) is  $4.8 + (3 \times 4.5) = 18.3 \text{ kHz}$  and the necessary bandwidth of the entire waveform depends on the number and combination of groups transmitted.

Table 6-2 illustrates all group combinations and corresponding bandwidths.

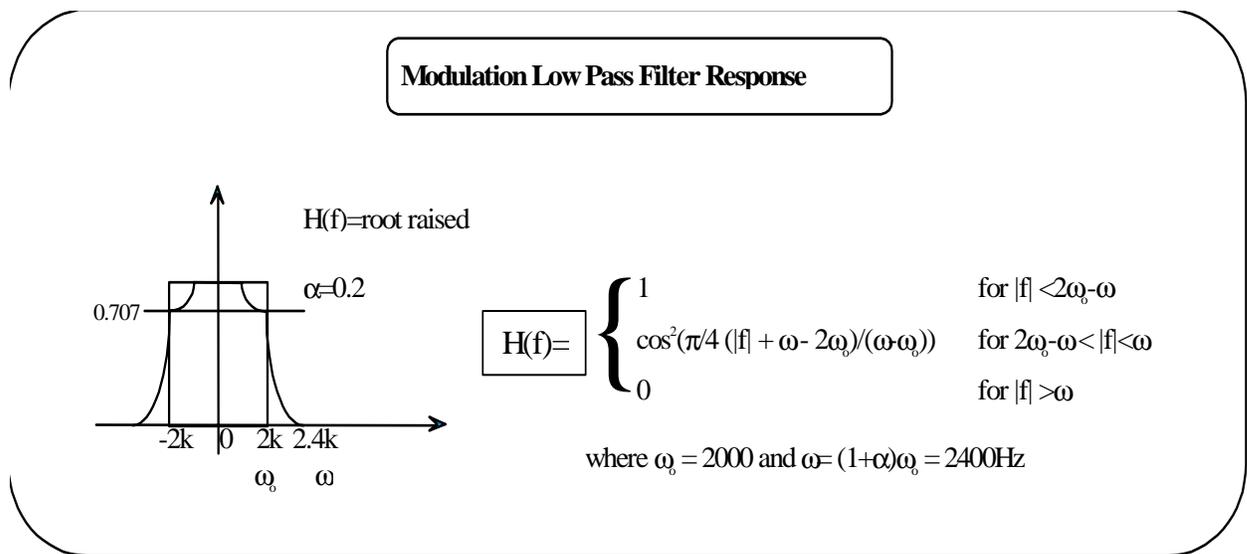
Case	Description (Figure)	Number of Groups	Number Of Sub-channels	Emission Designator
1	When Transmitting Voice, data or fax on one 25kHz channel (6.2.1)	1	4	18K3D7W
2	When Transmitting data on 2 adjacent 25kHz channels (6-2 (Adjacent))	2	8	43K3D7D
3	When Transmitting data on 3 adjacent 25kHz channels (6-3)	3	12	68K3D7D
4	When Transmitting data on the 2 outer 25kHz channels of 4 25kHz channels (6-2(outer))	2	8	93K3D7D
	When Transmitting data on 4 adjacent 25kHz channels (6-4)	4	16	93K3D7D

**Table 6-2: Waveform Description of all transmitted cases.**

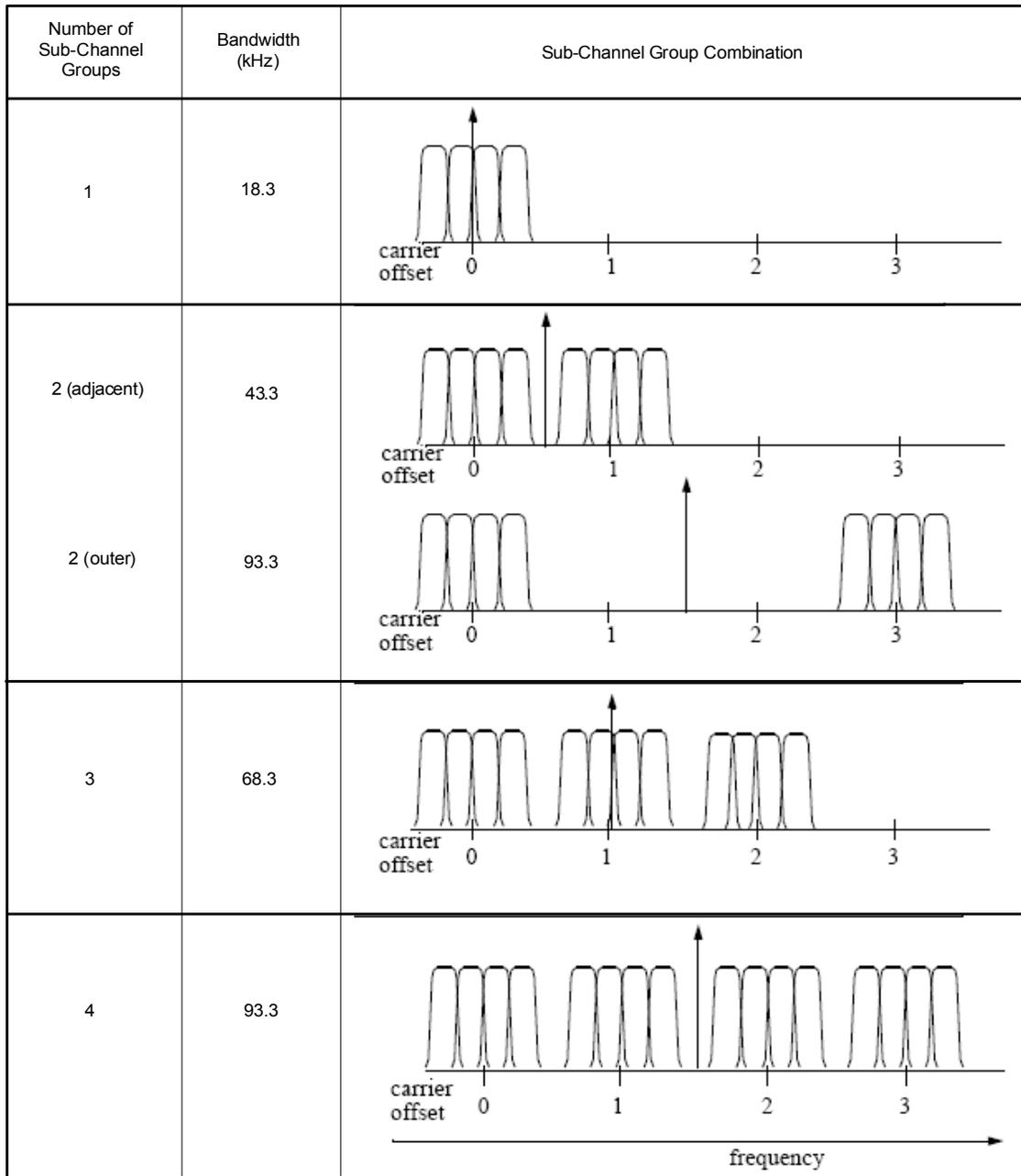
The designator for emissions in case 2 and 3 is determined by adding  $N \times 25$  to the first 2 digits, when  $N$  = the number of channels. The designator for case 4 is determined by adding  $3 \times 25$  to the first 2

digits because the outer channels are 3 channels apart. D is used for the last character when only data is transmitted, not telephony.

The limits for the masks are based on either 47 CFR 90.210(g) Emission Mask G or the EA SMR emission mask 90.691(a). Each Figure is identified as to the mask used.



**Figure 6a-1: Modulation Low Pass Filter Response**



**Figure 6a-2: Sub-Channel Group Combination Bandwidths**

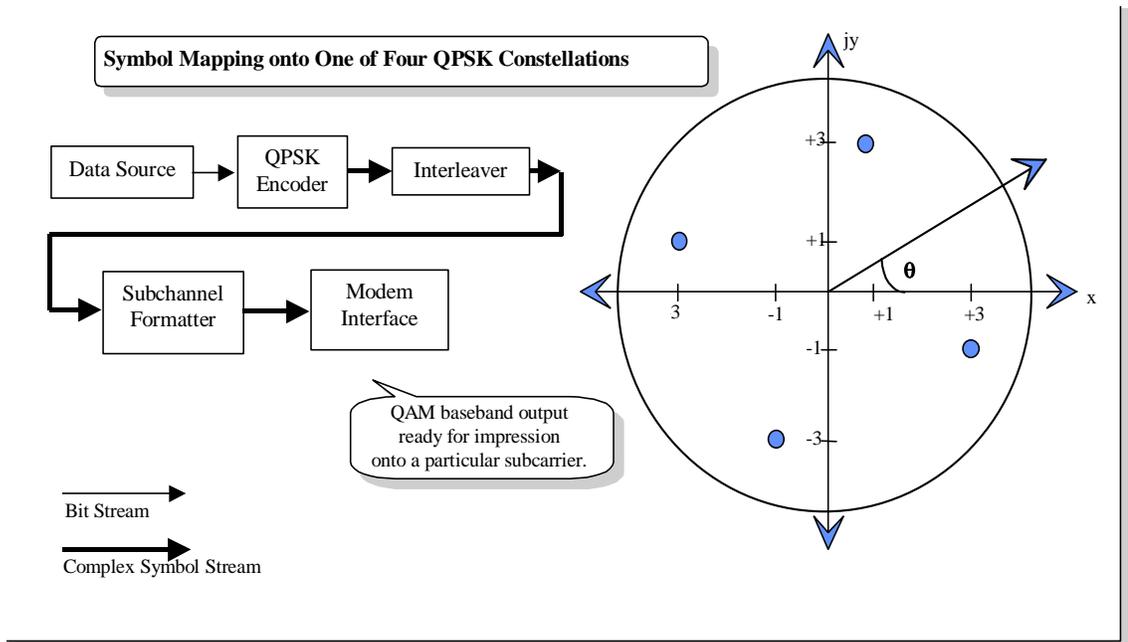


Figure 6a-3. Symbol Mapping onto One of Four QPSK Constellations

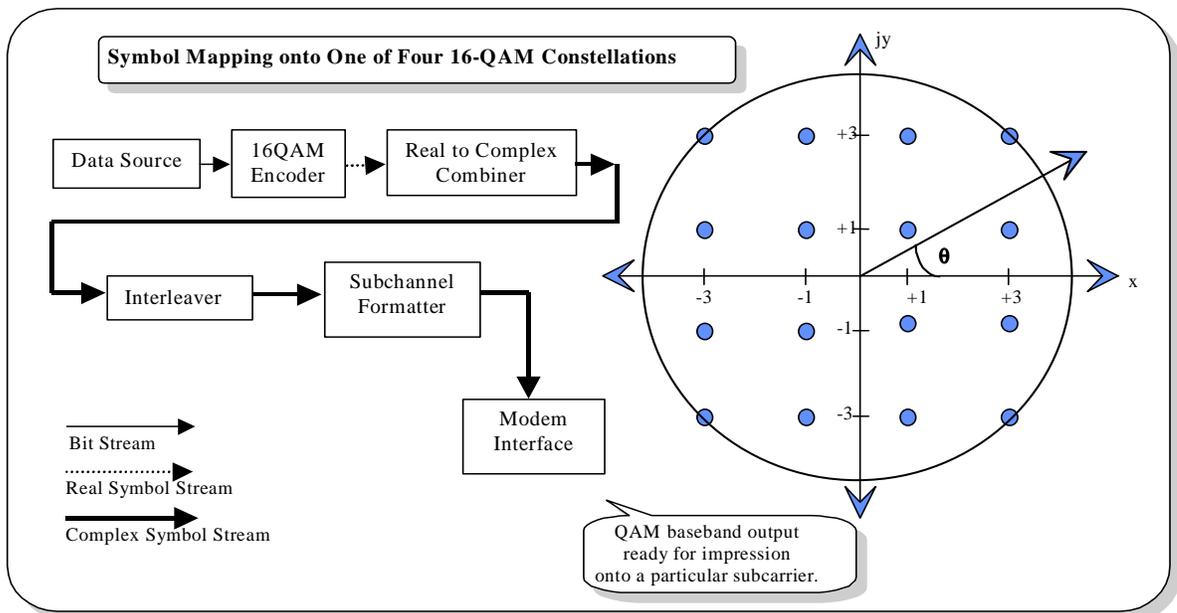
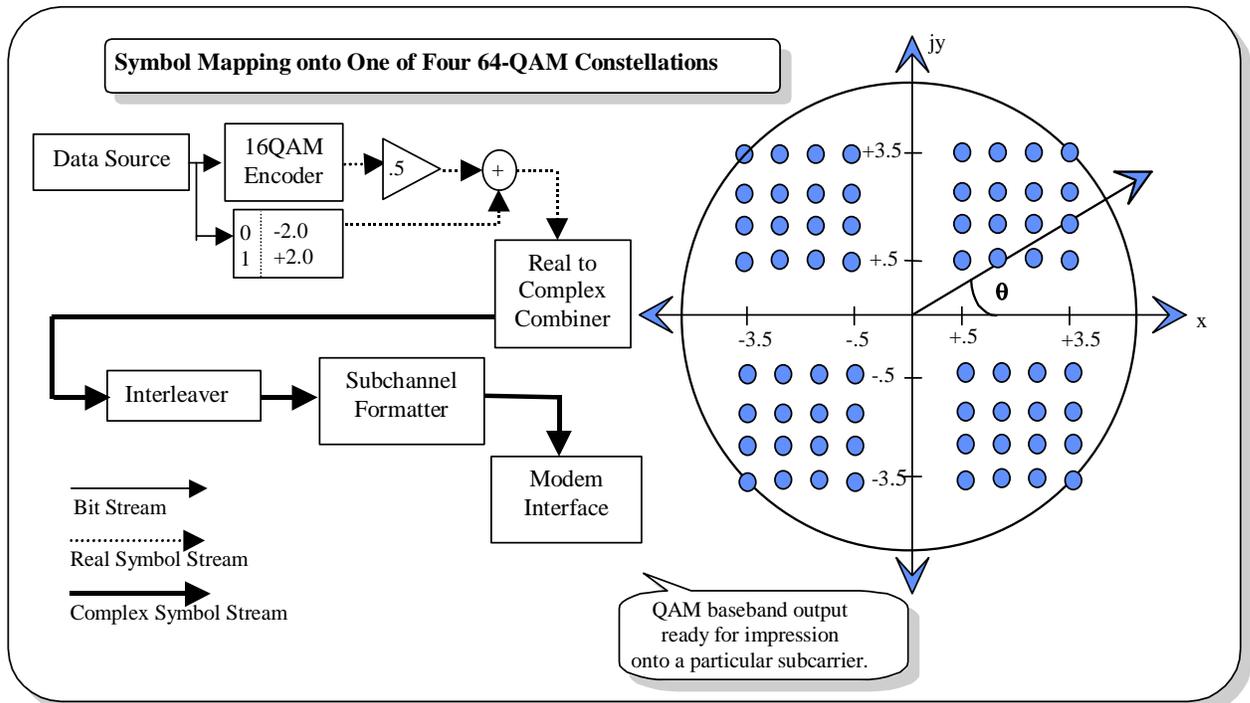


Figure 6a-4. Symbol Mapping onto One of Four 16-QAM Constellations



**Figure 6a-5. Symbol Mapping onto One of Four 64-QAM Constellations**

**Annex 2 to the test report MOTRAD\_FCC.17112\_rev1,  
copy of i760 FCC ID:AZ489FT5844 original application**

## 6a.2.2 Emission Designator 18K3D7W - iDEN 800 MHz Band Measured data

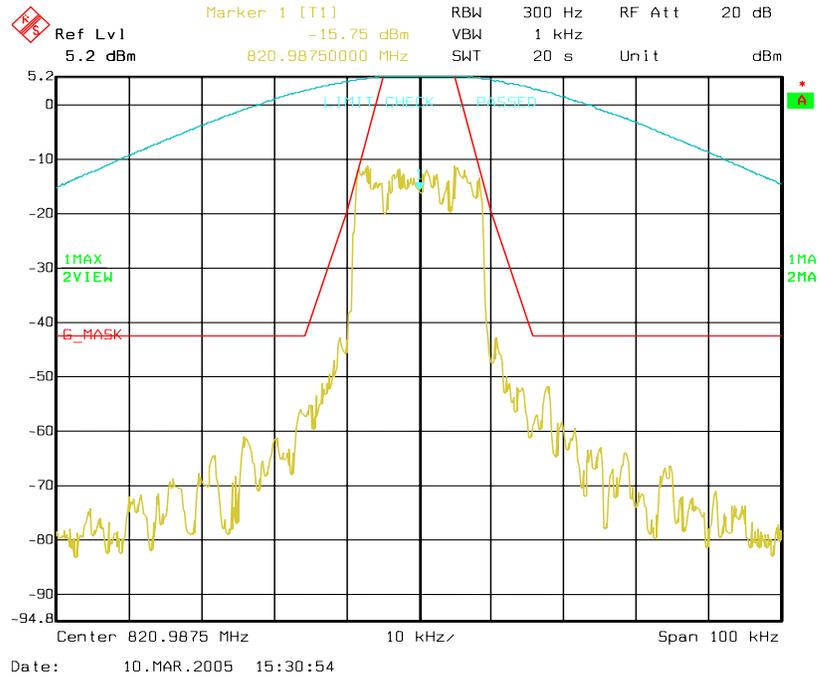


Figure 6a-6 . iDEN 800 MHz Band, QPSK, Maximum Power, Emission Mask G

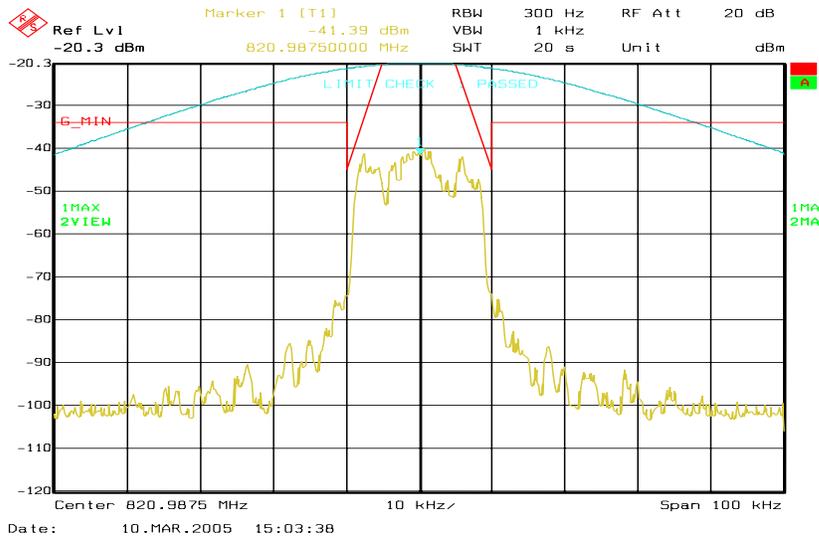
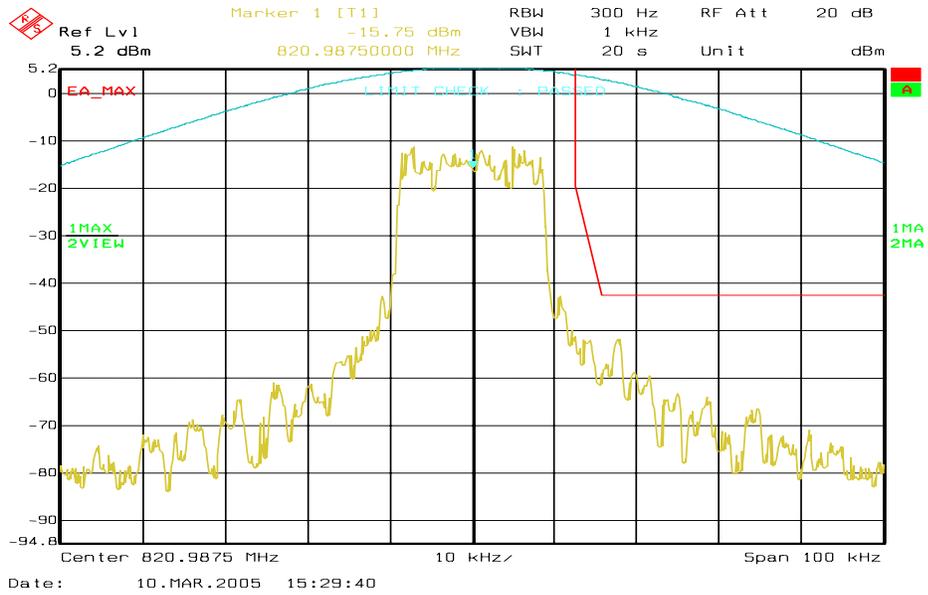
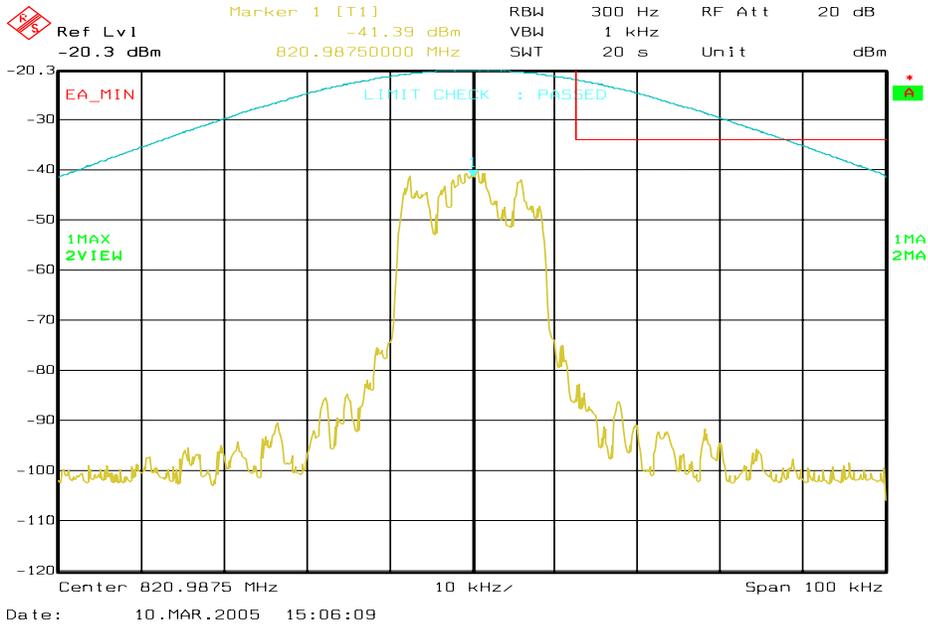


Figure 6a-7. iDEN 800 MHz Band, QPSK, Minimum Power, Emission Mask G



**Figure 6a-8 . iDEN 800 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



**Figure 6a- 9. iDEN 800 MHz Band, QPSK, Minimum Power, EA Emission Mask**

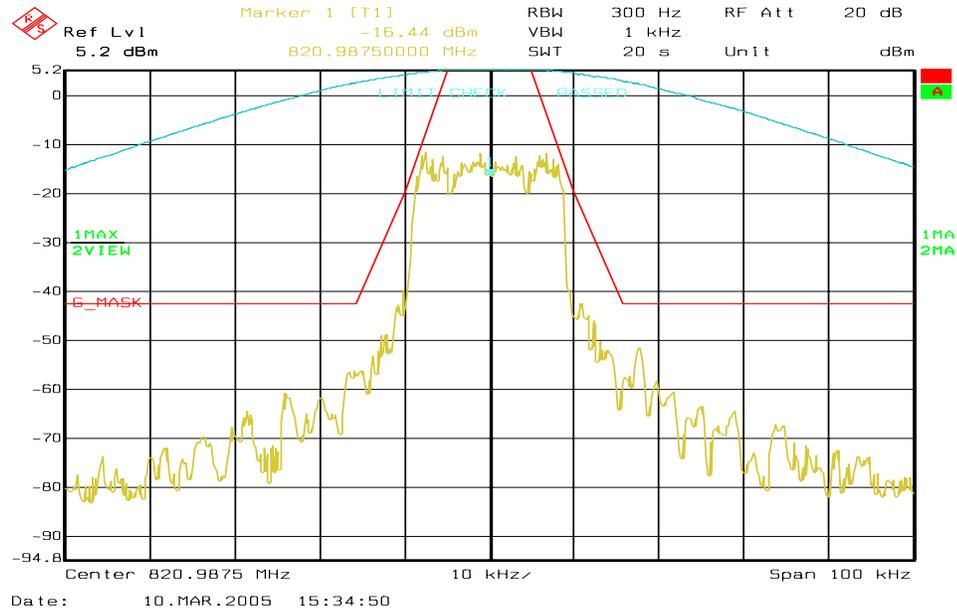


Figure 6a-10 . iDEN 800 MHz Band, QAM16, Maximum Power, Emission Mask G

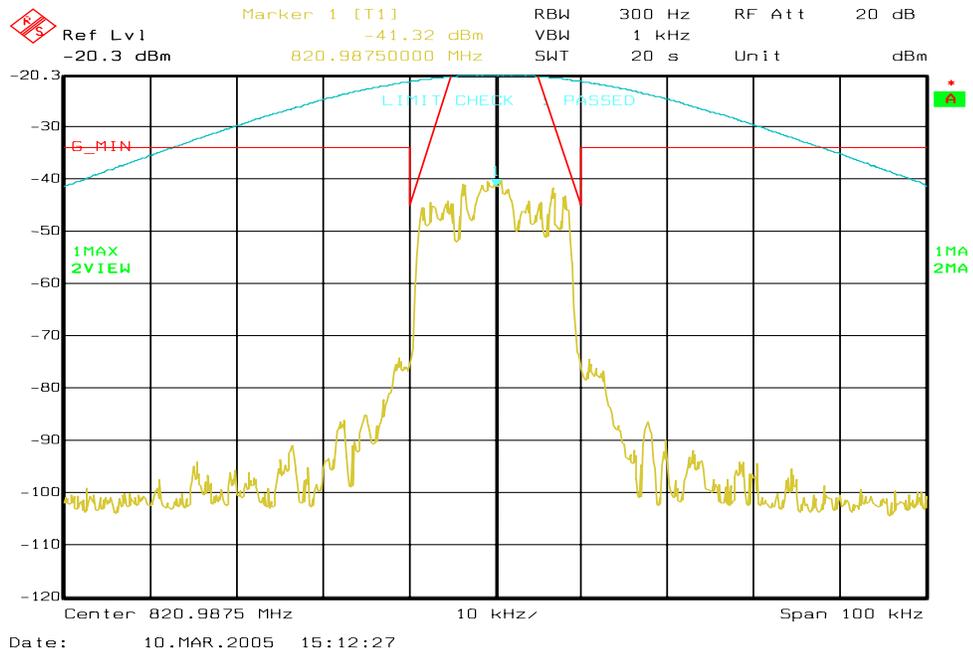


Figure 6a-11 . iDEN 800 MHz Band, QAM16, Minimum Power, Emission Mask G

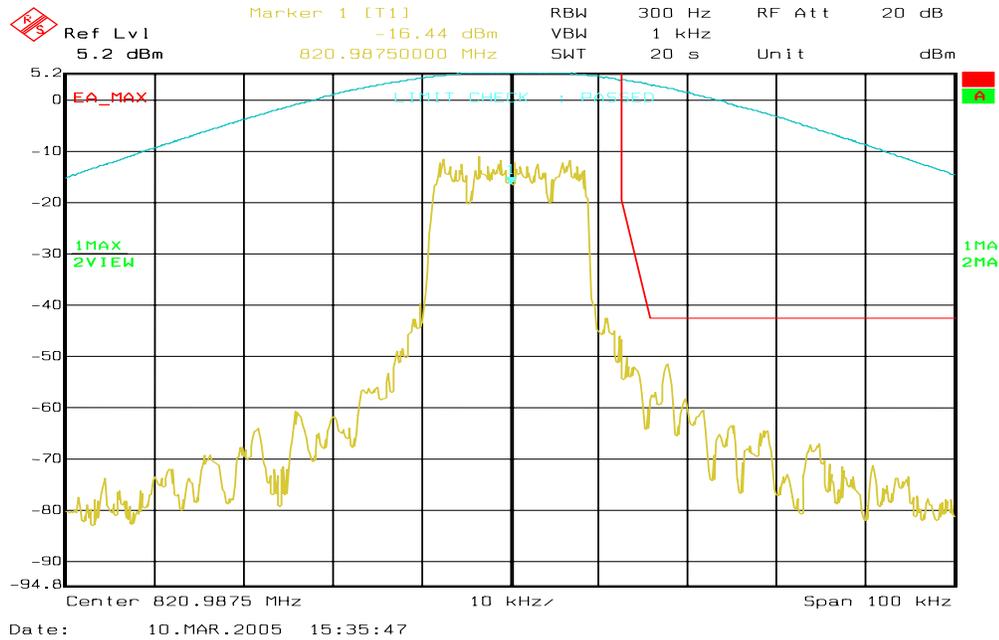


Figure 6a-12 . iDEN 800 MHz Band, QAM16, Maximum Power, EA Emission Mask

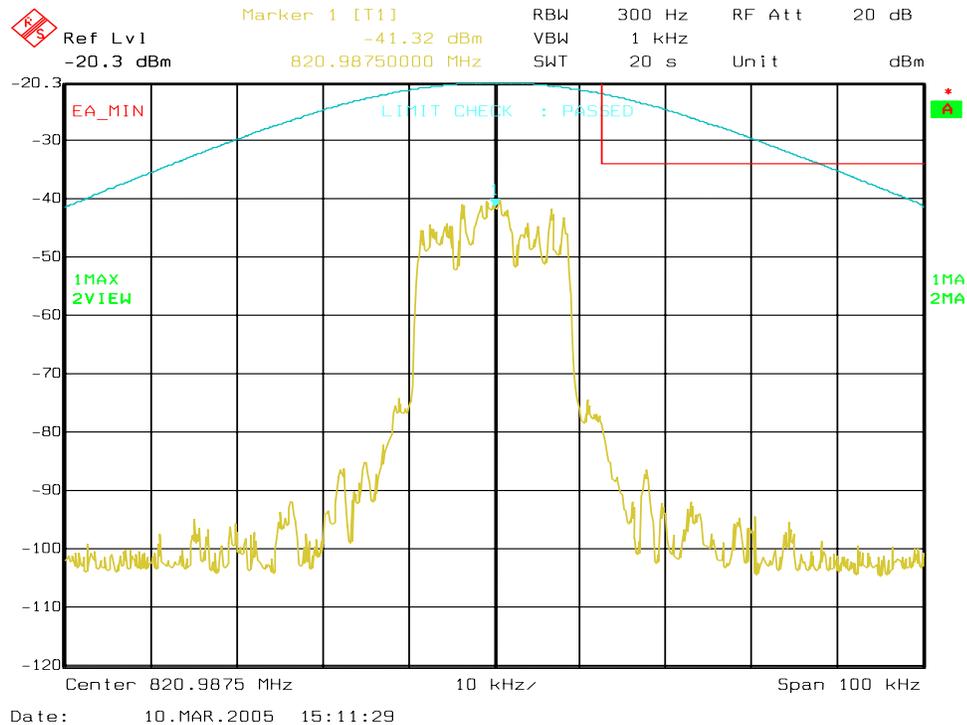


Figure 6a-13 . iDEN 800 MHz Band, QAM16, Minimum Power, EA Emission Mask

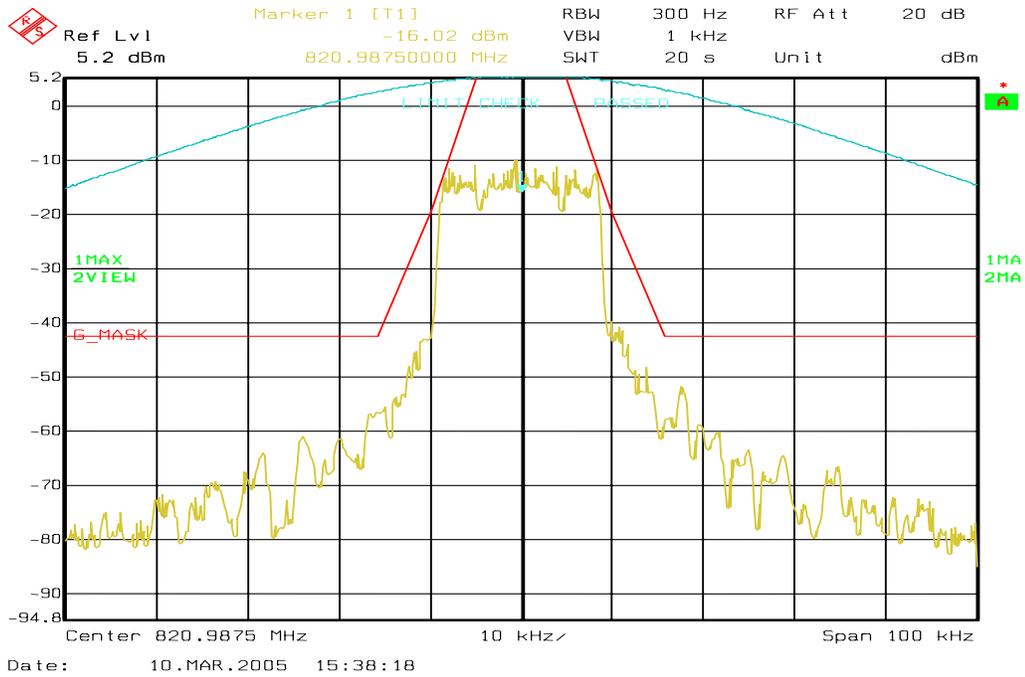


Figure 6a-14 . iDEN 800 MHz Band, QAM64, Maximum Power, Emission Mask G

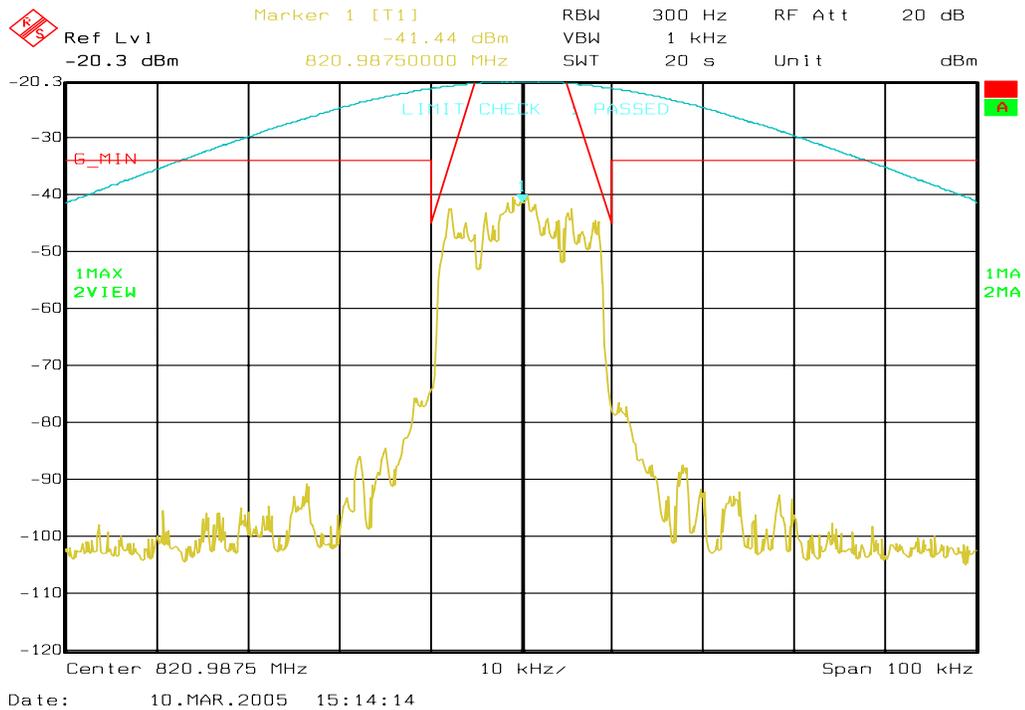


Figure 6a-15 . iDEN 800 MHz Band, QAM64, Minimum Power, Emission Mask G

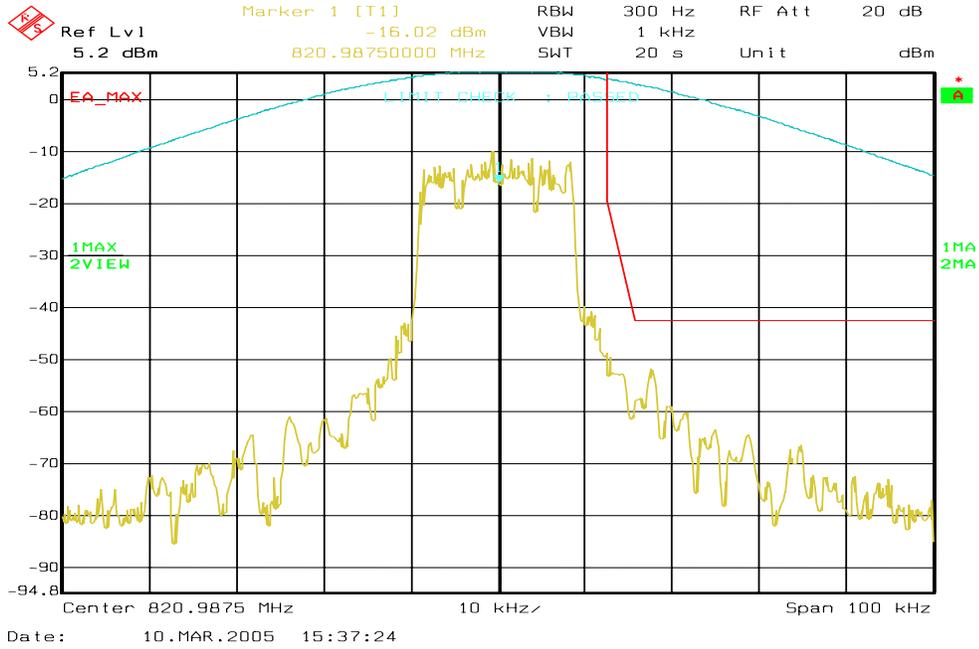


Figure 6a-16 . iDEN 800 MHz Band, QAM64, Maximum Power, EA Emission Mask

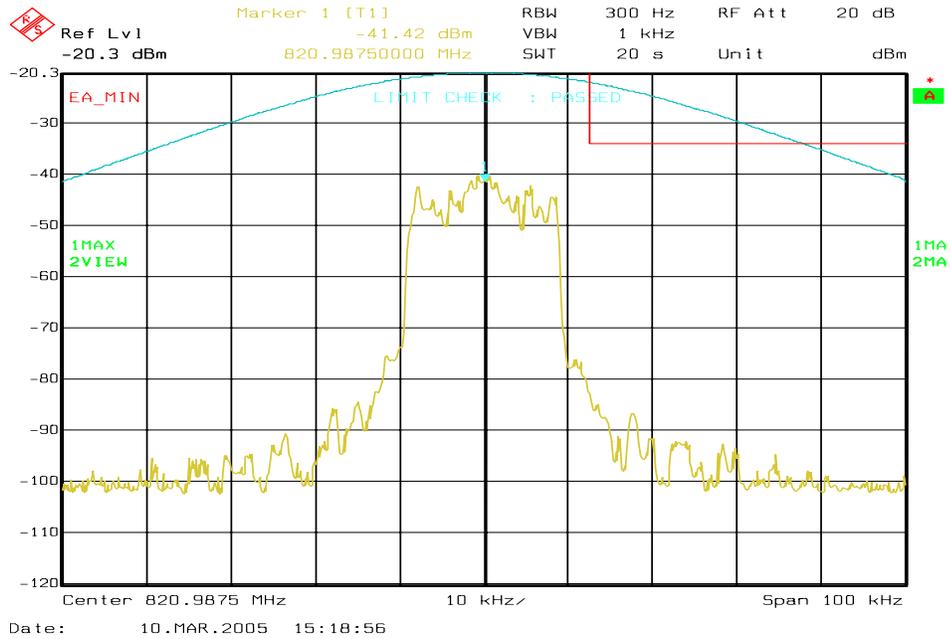


Figure 6a-17 . iDEN 800 MHz Band, QAM64, Minimum Power, EA Emission Mask

### 6a.2.3 Emission Designator 18K3D7W - iDEN 900 MHz Band Measured Data

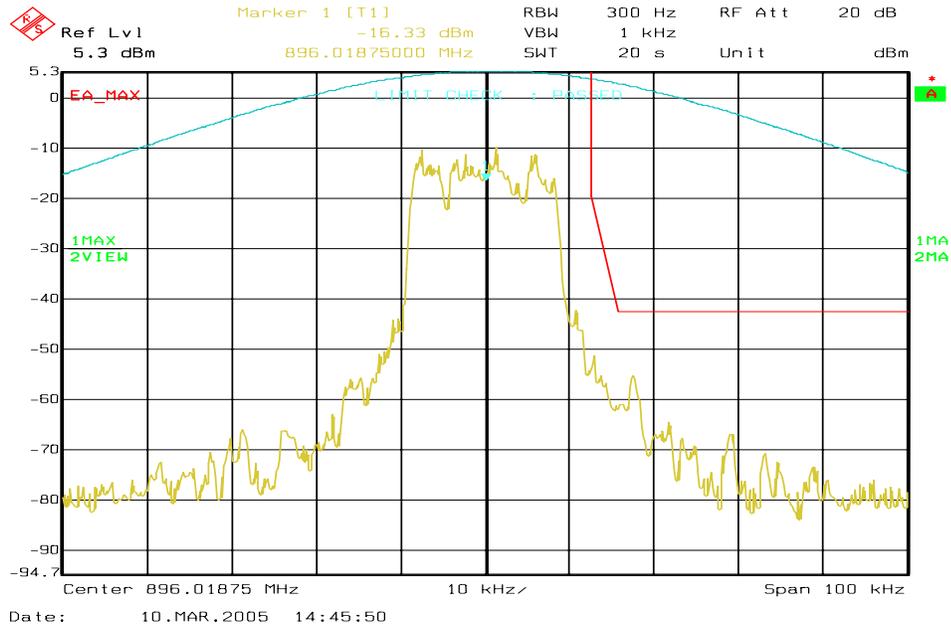


Figure 6a-18 . iDEN 900 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask

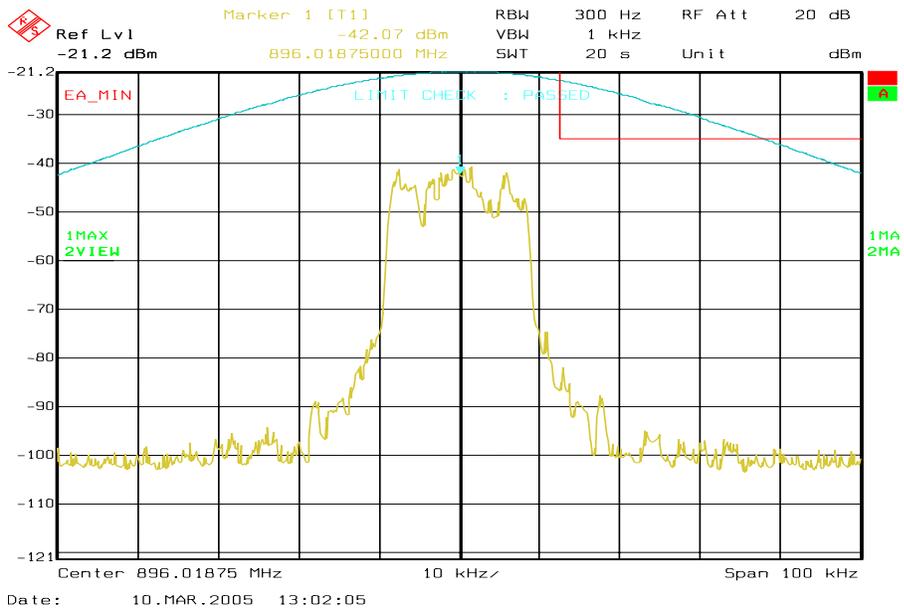


Figure 6a-19 . iDEN 900 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask

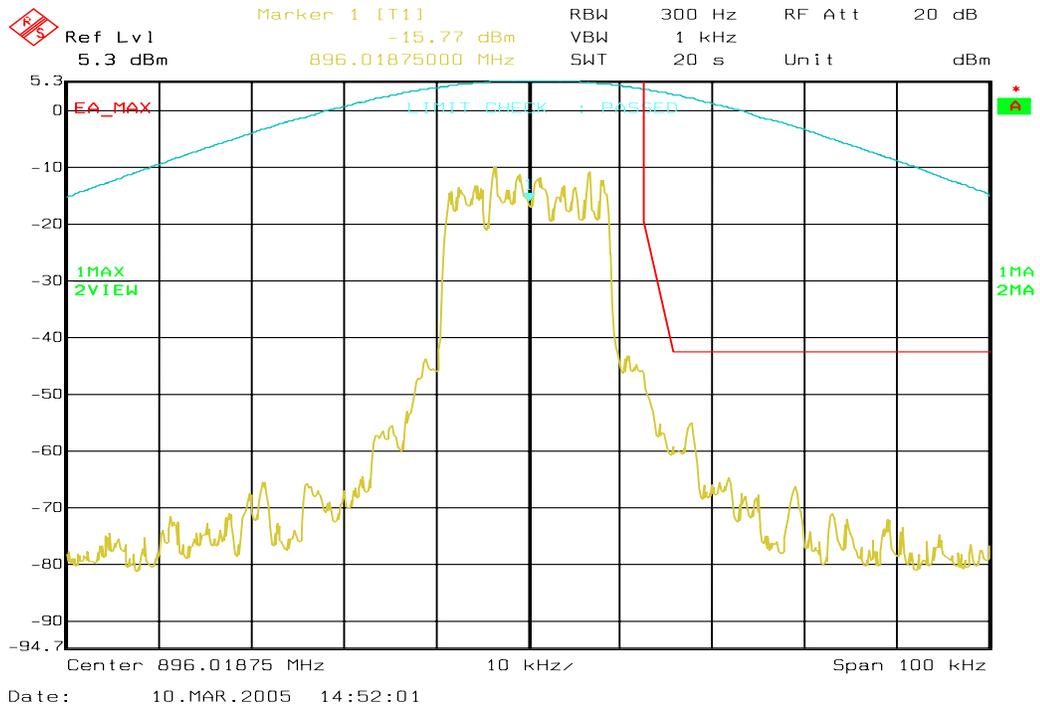


Figure 6a-20 . iDEN 900 MHz Band, QAM16, Maximum Power, EA Emission Mask

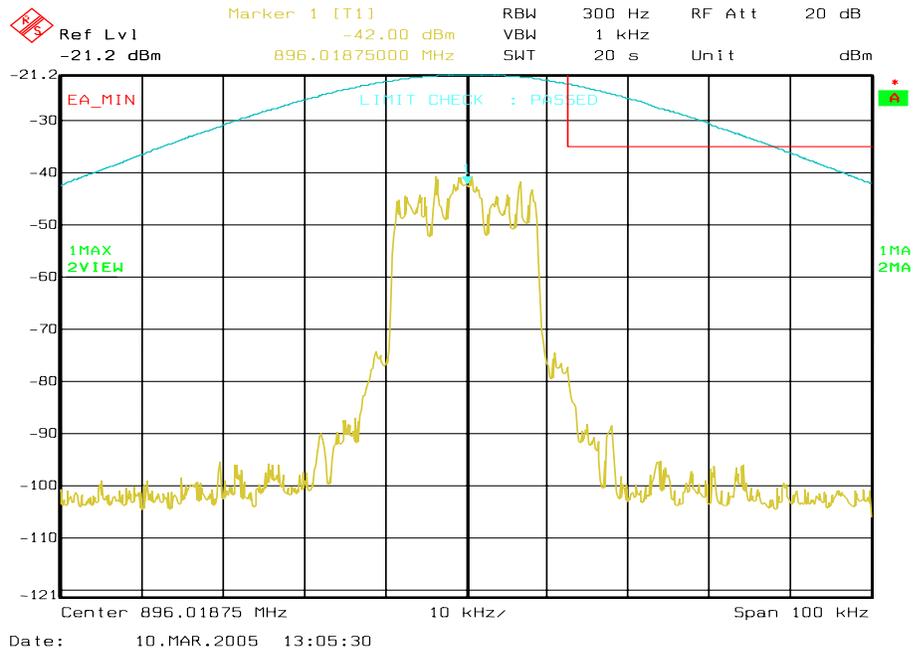


Figure 6a-21 . iDEN 900 MHz Band, QAM16, Minimum Power, EA Emission Mask

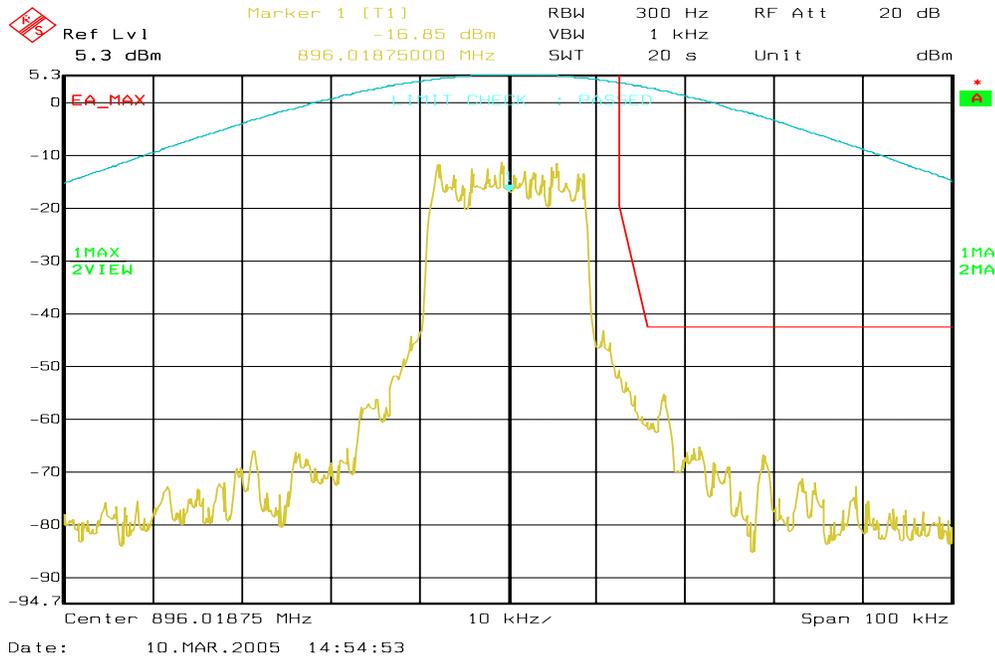


Figure 6a-22 . iDEN 900 MHz Band, QAM64, Maximum Power, EA Emission Mask

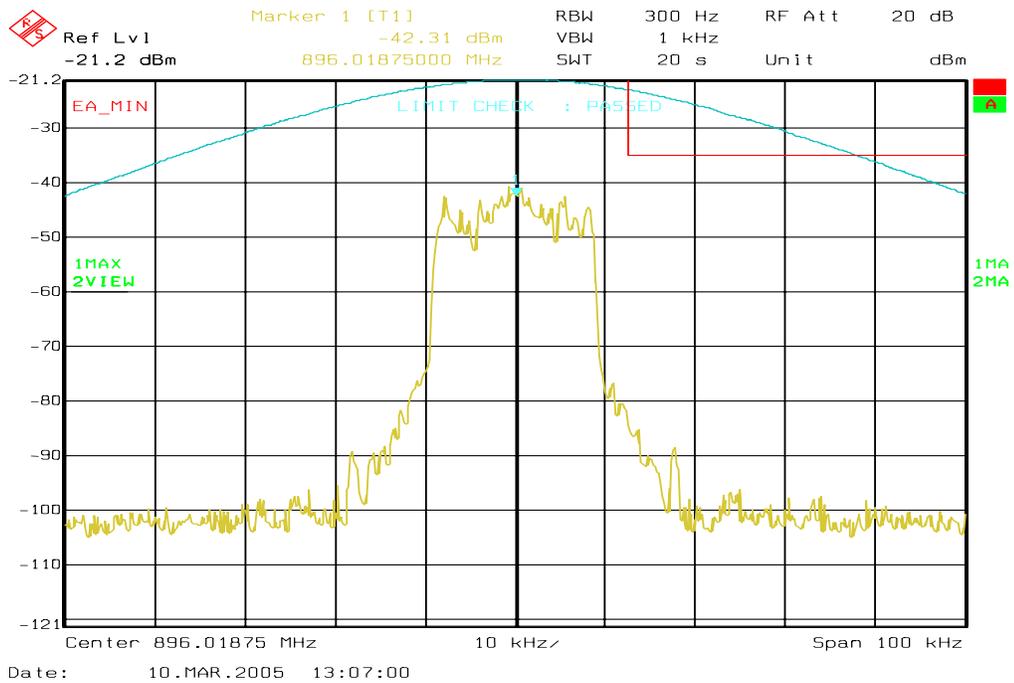
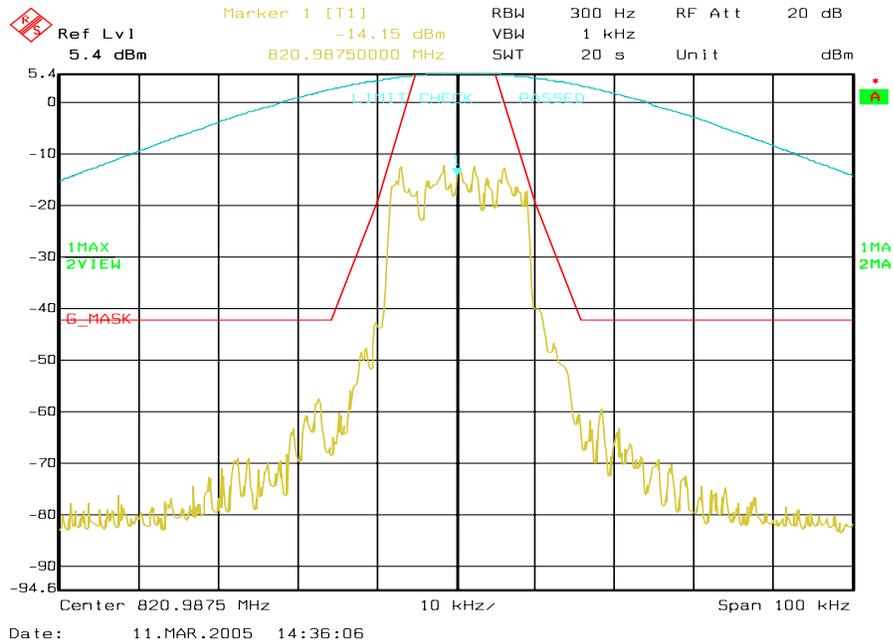
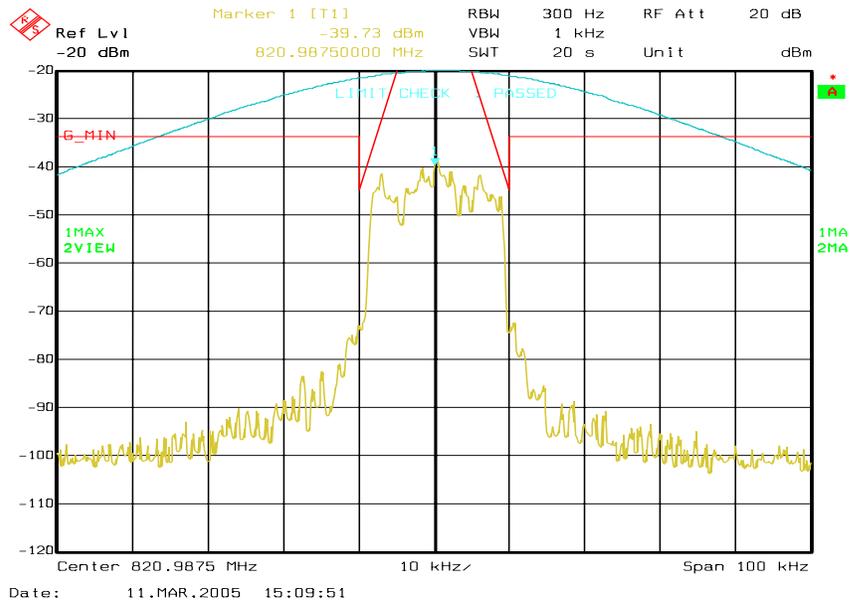


Figure 6a-23 . iDEN 900 MHz Band, QAM64, Minimum Power, EA Emission Mask

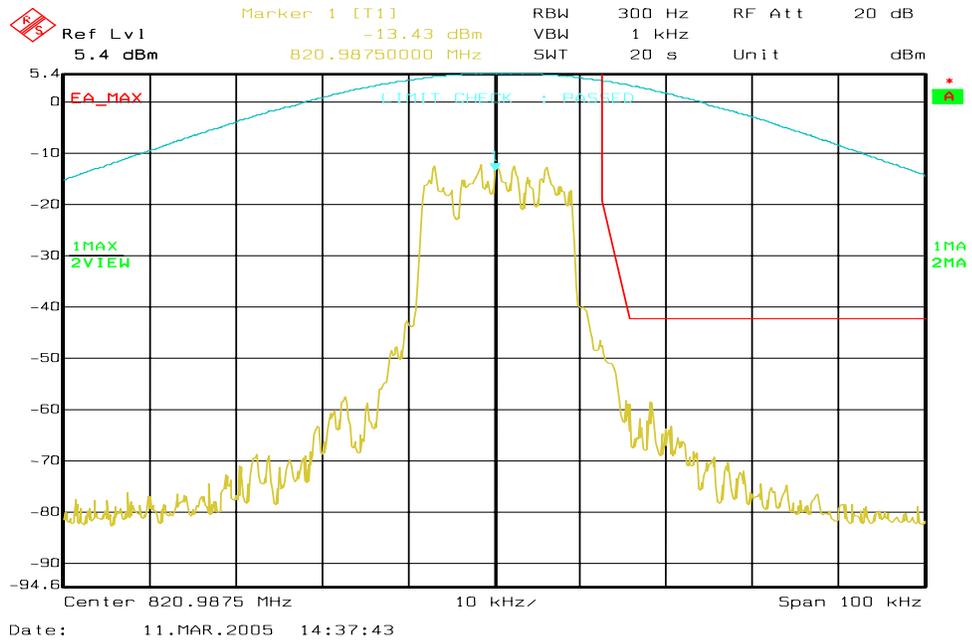
### 6a.2.4 Emission Designator 18K3D7W - WiDEN25 800 MHz Band



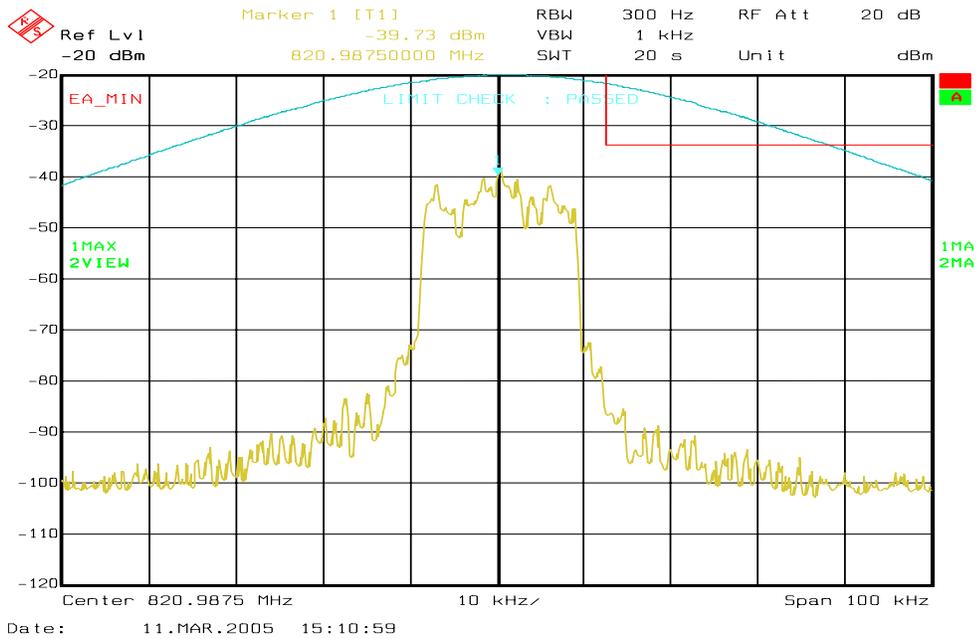
**Figure 6a-24 . WiDEN25 800 MHz Band, Quad-QPSK, Maximum Power, Emission Mask G**



**Figure 6a-25 . WiDEN25 800 MHz Band, Quad-QPSK, Minimum Power, Emission Mask G**



**Figure 6a-26 . WiDEN25 800 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



**Figure 6a- 27. WiDEN25 800 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask**

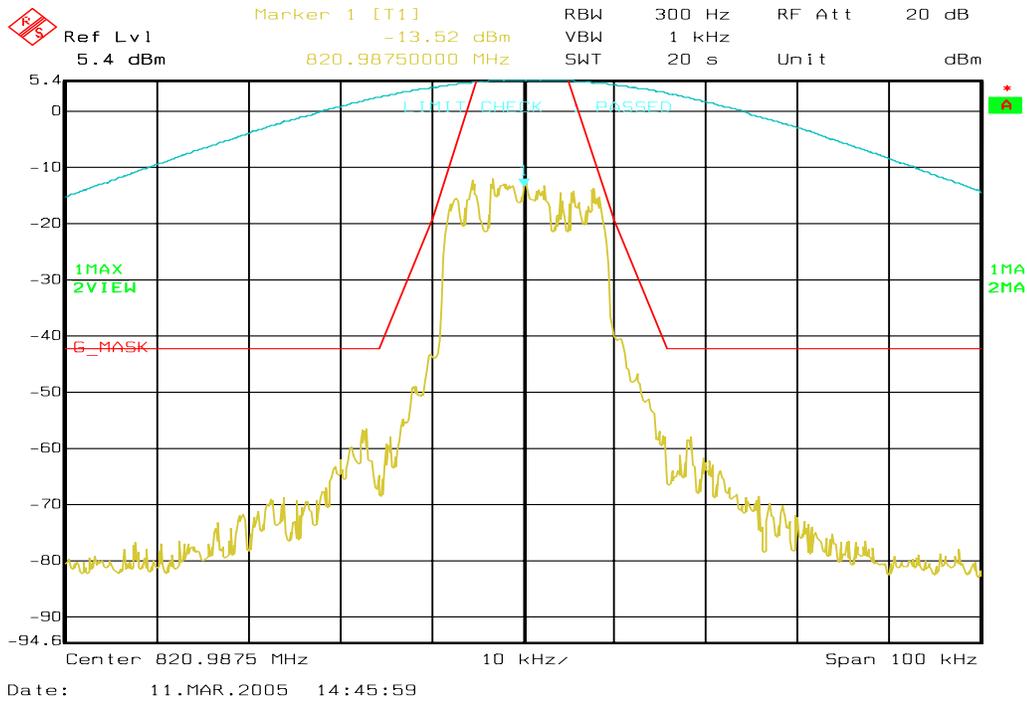


Figure 6a-28 . WiDEN25 800 MHz Band, QAM16, Maximum Power, Emission Mask G

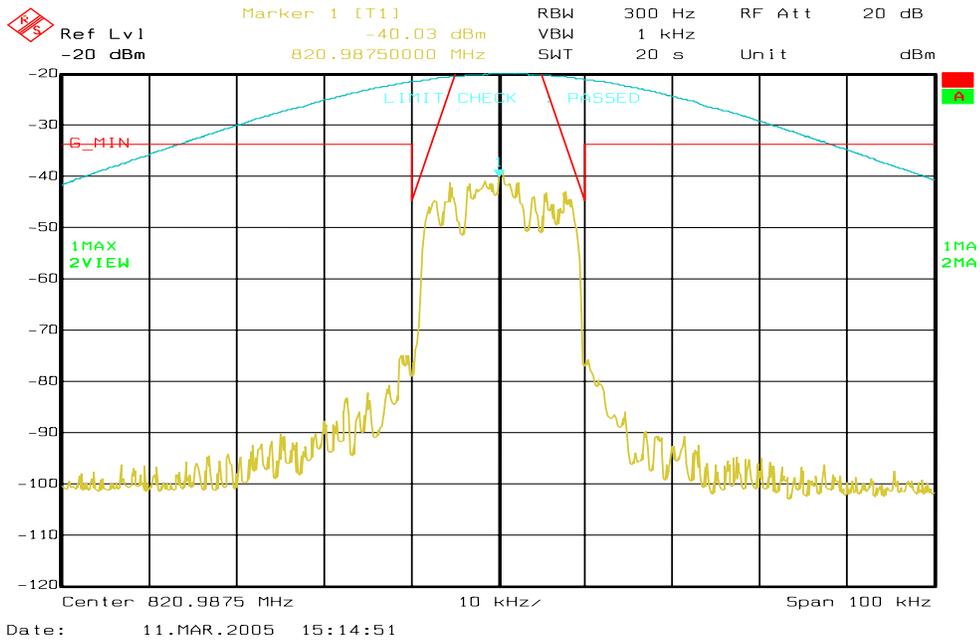


Figure 6a-29 . WiDEN25 800 MHz Band, QAM16, Minimum Power, Emission Mask G

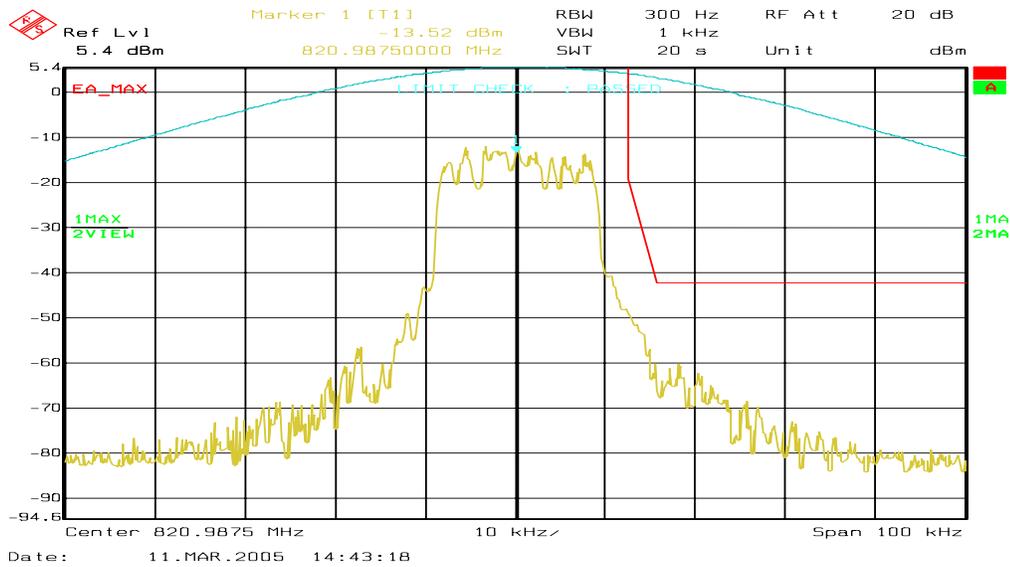


Figure 6a-30 . WiDEN25 800 MHz Band, QAM16, Maximum Power, EA Emission Mask

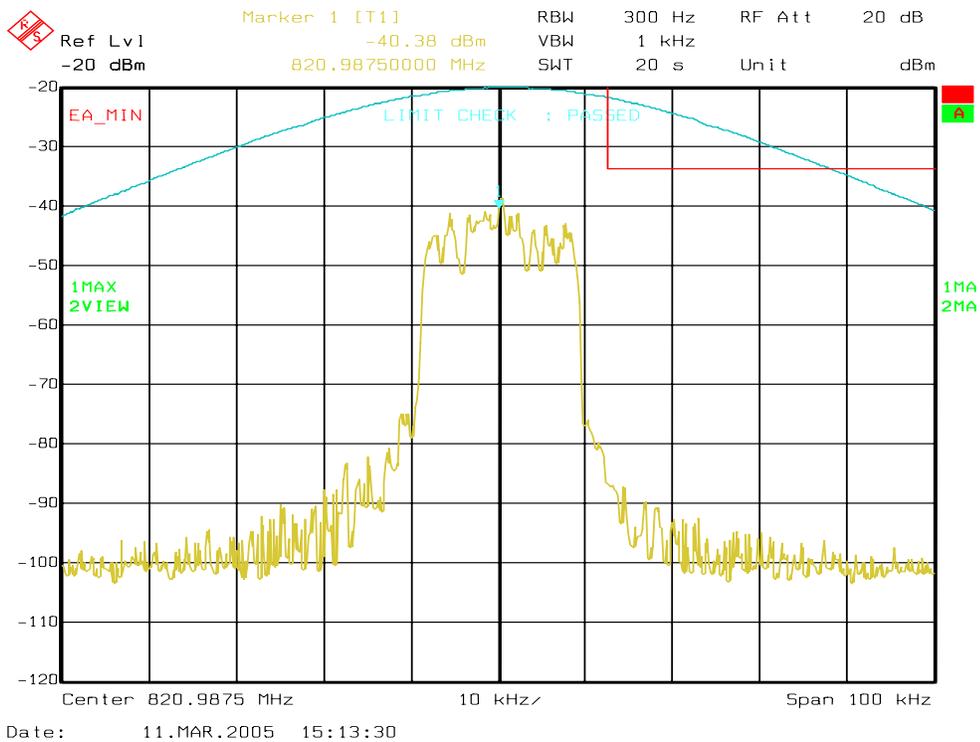


Figure 6a-31 . WiDEN25 800 MHz Band, QAM16, Minimum Power, EA Emission Mask

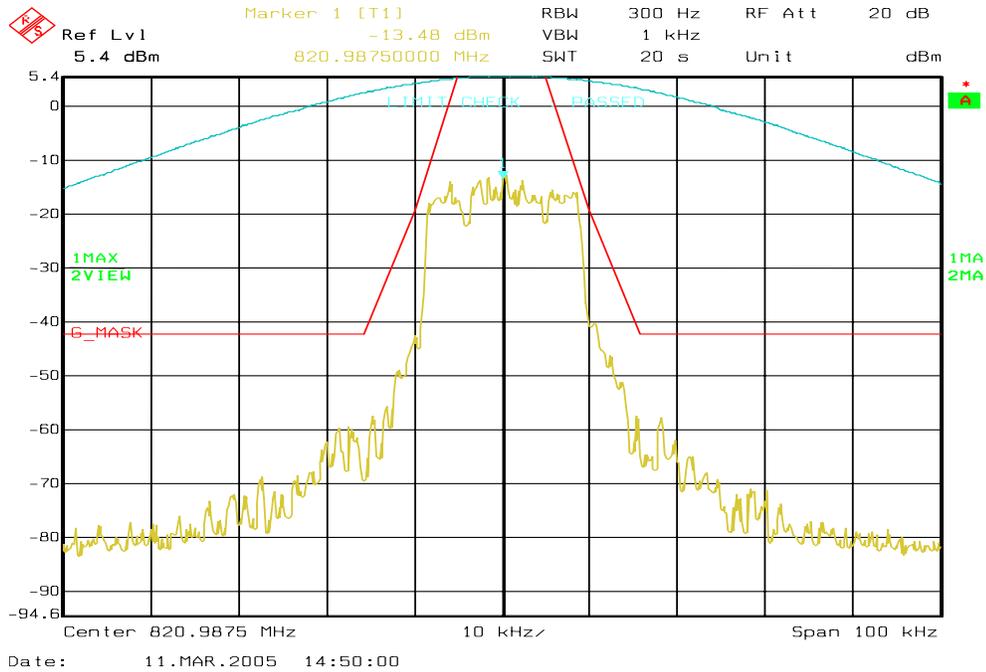


Figure 6a-32 . WiDEN25 800 MHz Band, QAM64, Maximum Power, Emission Mask G

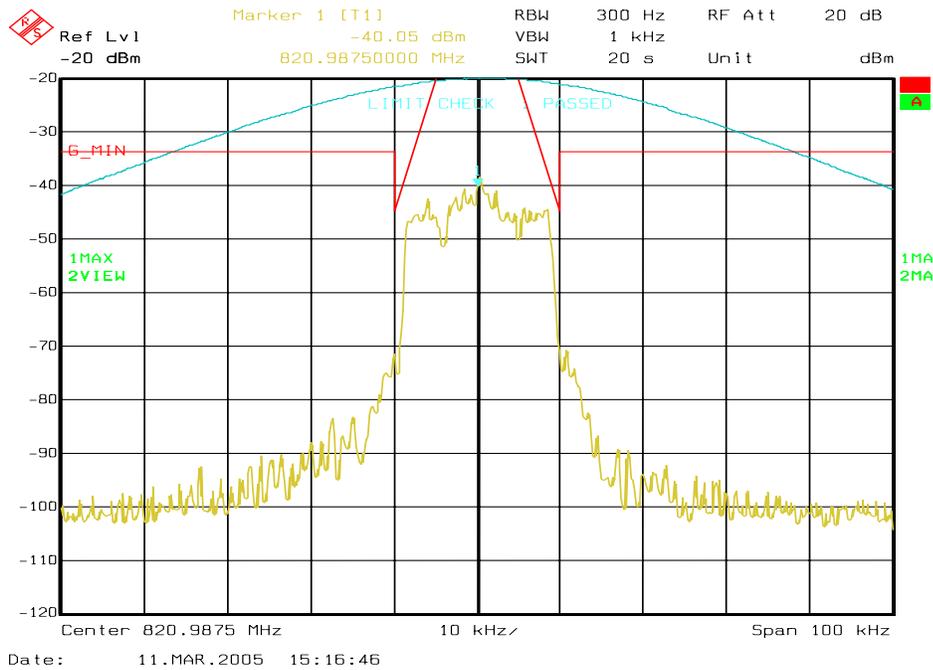


Figure 6a-33 . WiDEN25 800 MHz Band, QAM64, Minimum Power, Emission Mask G

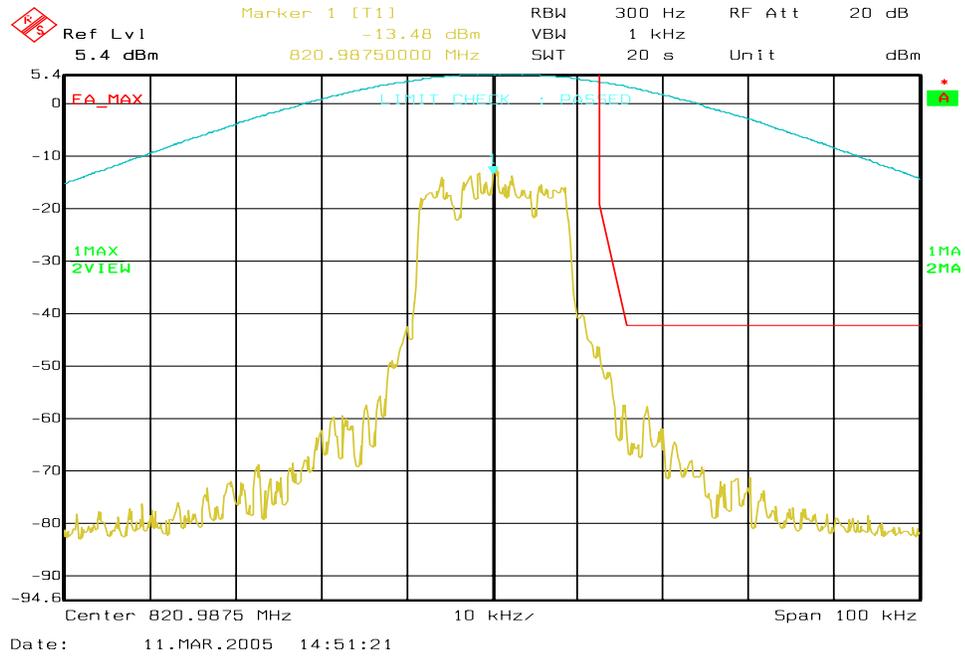


Figure 6a-34 . WiDEN25 800 MHz Band, QAM64, Maximum Power, EA Emission Mask

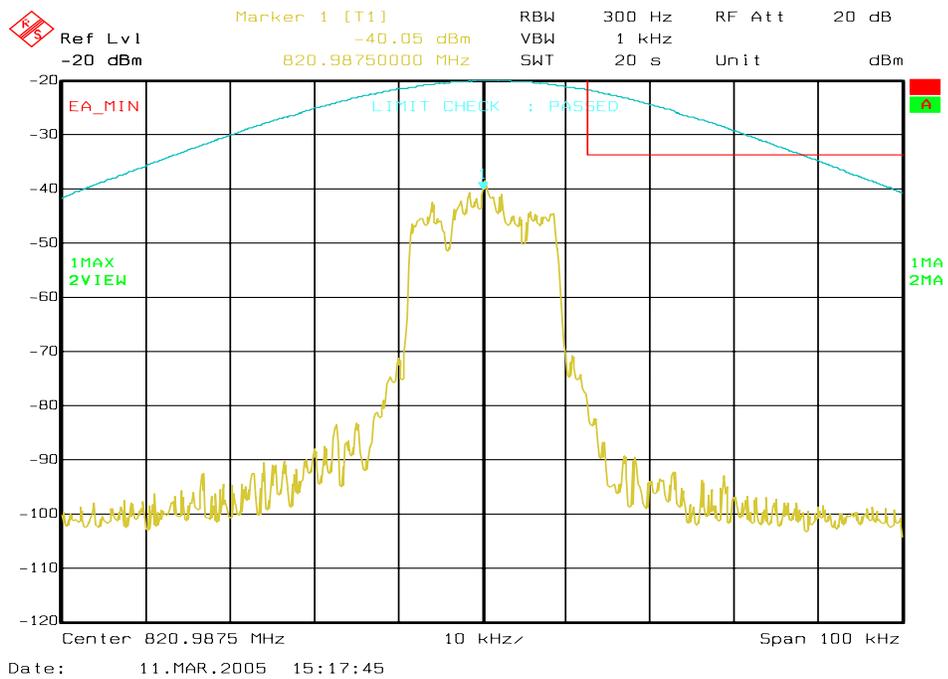


Figure 6a-35 . WiDEN25 800 MHz Band, QAM64, Minimum Power, EA Emission Mask

### 6.a.2.5 Emission Designator 43K3D7D - WiDEN50 800 MHz Band

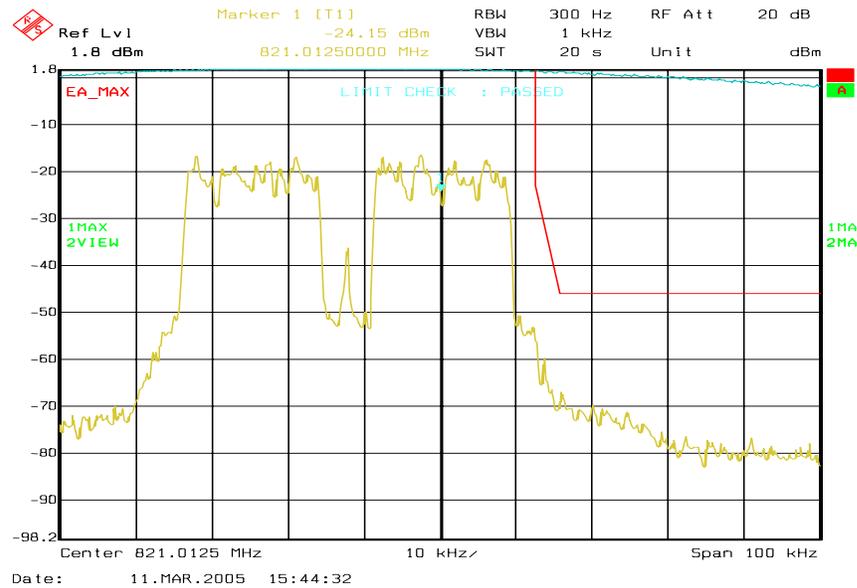


Figure 6a-36 . WiDEN50 800 MHz Band, Continuous Quad-QPSK, Maximum Power, EA Emission Mask

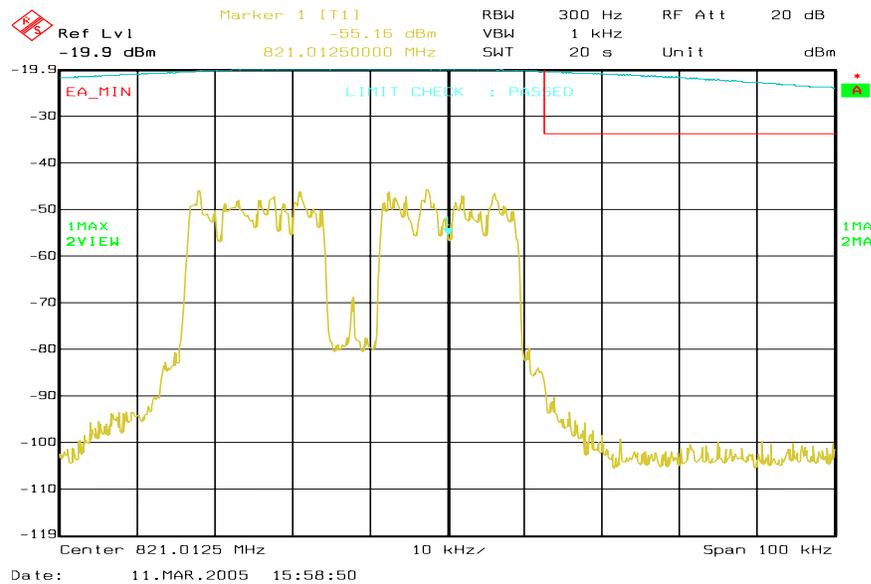
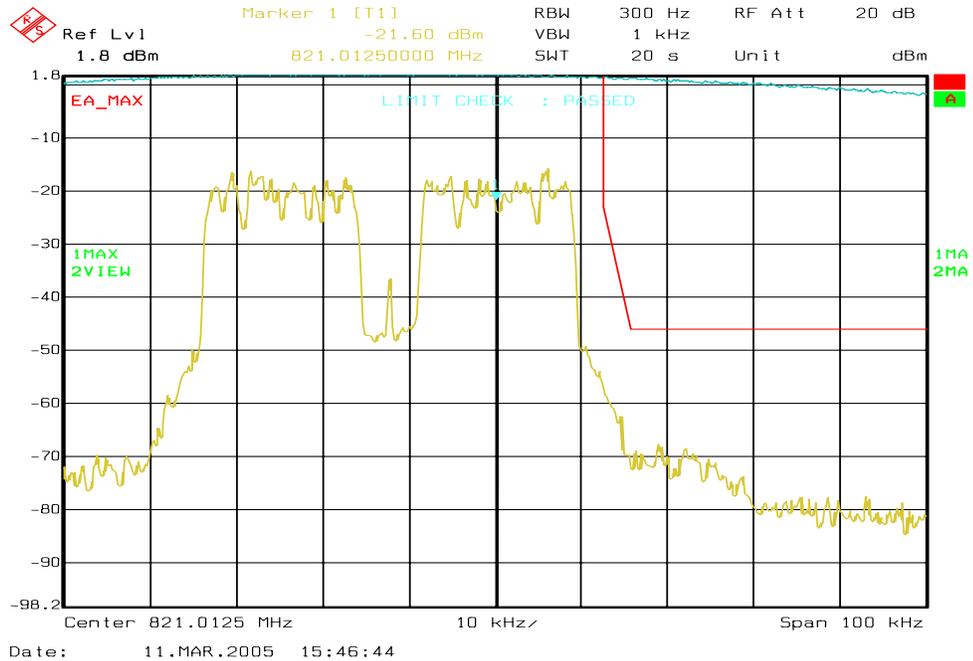
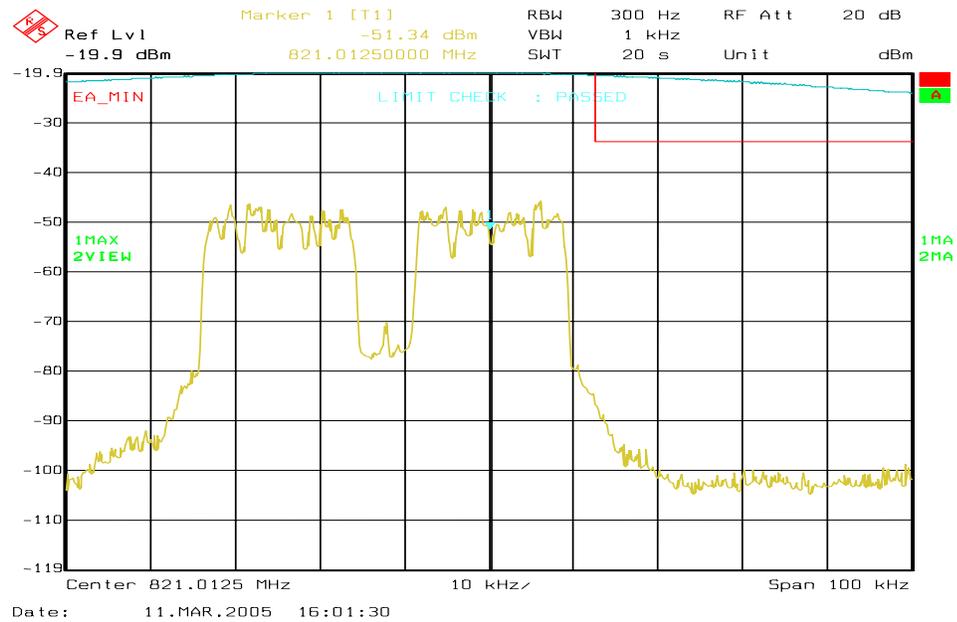


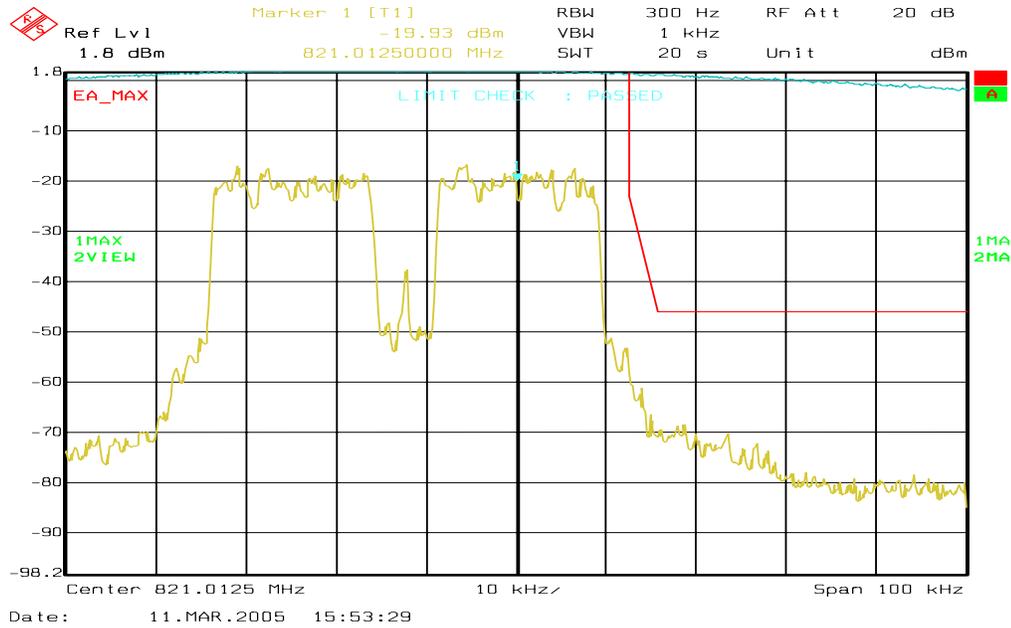
Figure 6a-37 . WiDEN50 800 MHz Band, Continuous Quad-QPSK, Minimum Power, EA Emission Mask



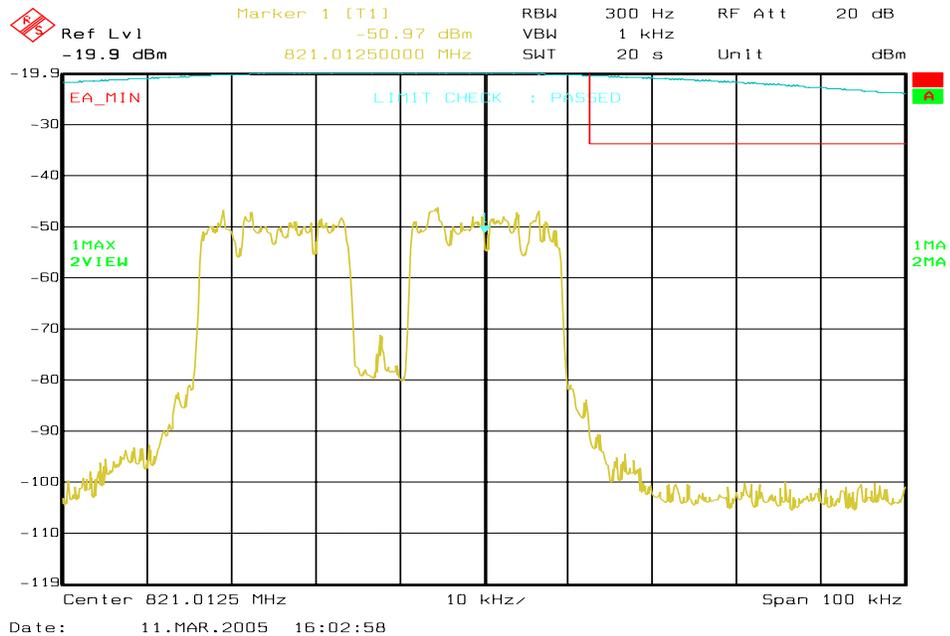
**Figure 6a-38. WiDEN50 800 MHz Band, Continuous QAM16, Maximum Power, EA Emission Mask**



**Figure 6a-39 . WiDEN50 800 MHz Band, Continuous QAM16, Minimum Power, EA Emission Mask**



**Figure 6a-40 . WiDEN50 800 MHz Band, Continuous QAM64, Maximum Power, EA Emission Mask**



**Figure 6a-41 . WiDEN50 800 MHz Band, Continuous QAM64, Minimum Power, EA Emission Mask**

### 6a.2.6 Emission Designator 68K3D7D - WiDEN75 800 MHz Band

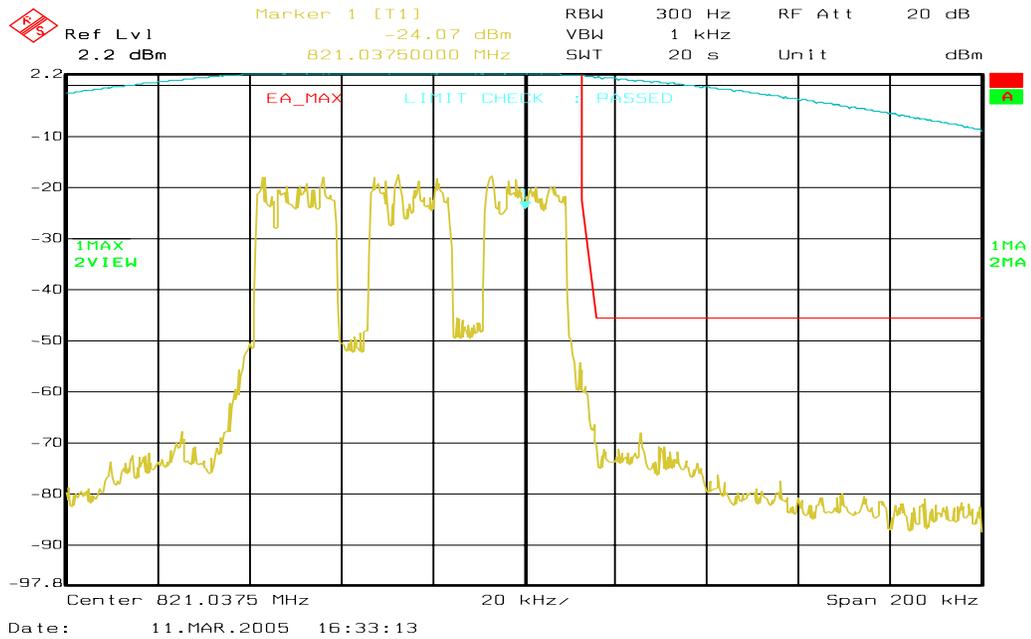


Figure 6a-42 . WiDEN75 800 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask

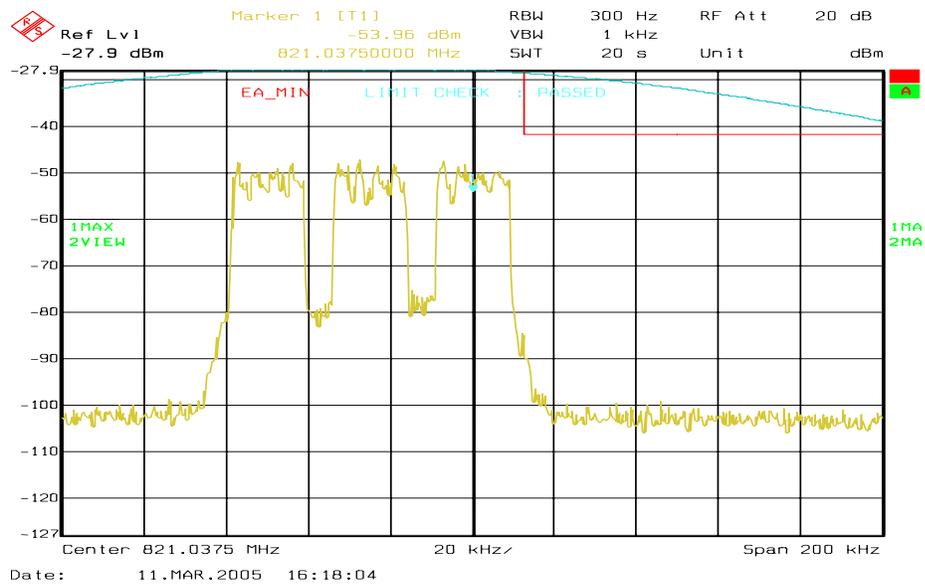
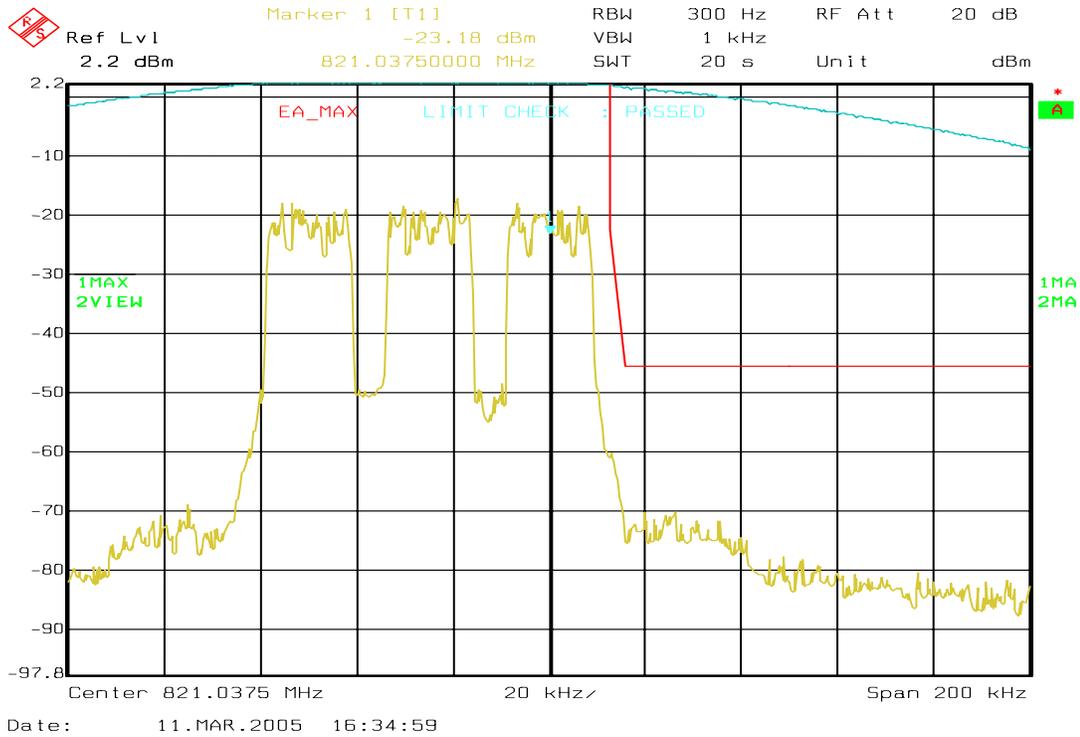
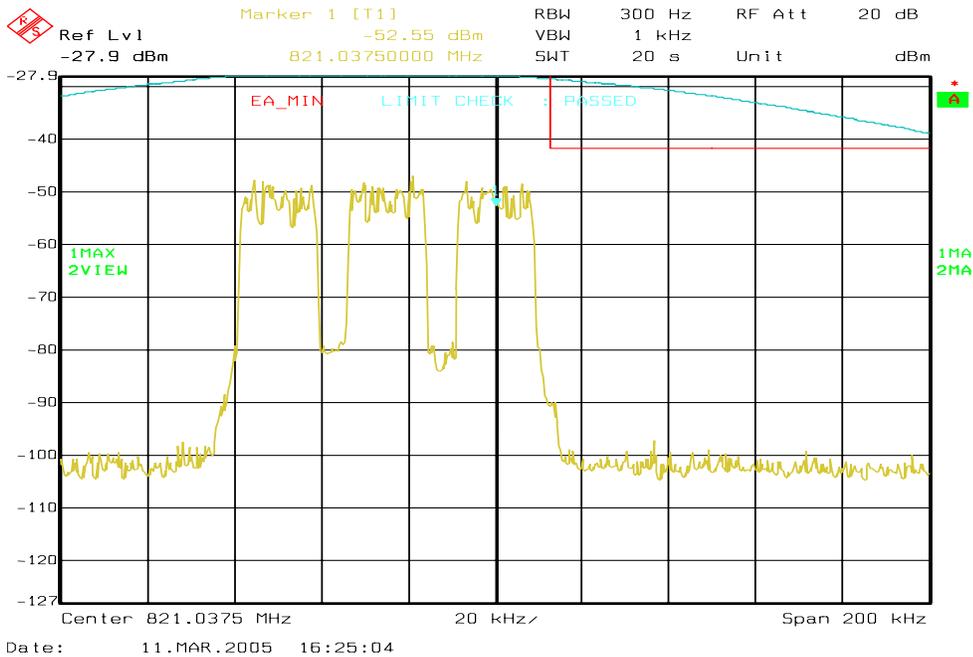


Figure 6a-43 . WiDEN75 800 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask



**Figure 6a-44 . WiDEN75 800 MHz Band, QAM16, Maximum Power, EA Emission Mask**



**Figure 6a-45 . WiDEN75 800 MHz Band, QAM16, Minimum Power, EA Emission Mask**

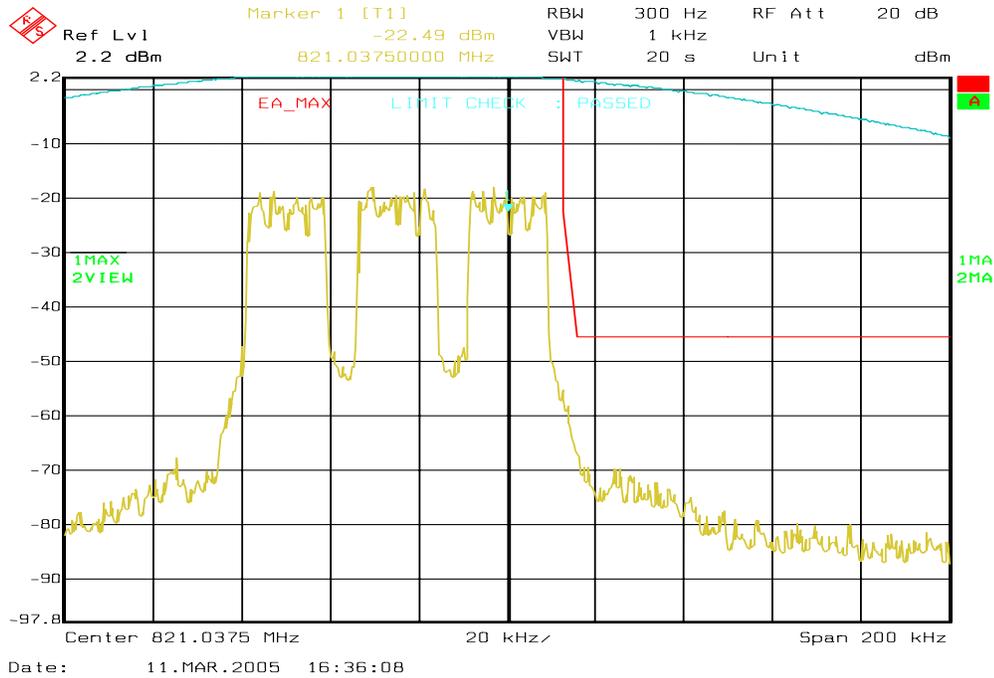


Figure 6a-46 . WiDEN75 800 MHz Band, QAM64, Maximum Power, EA Emission Mask

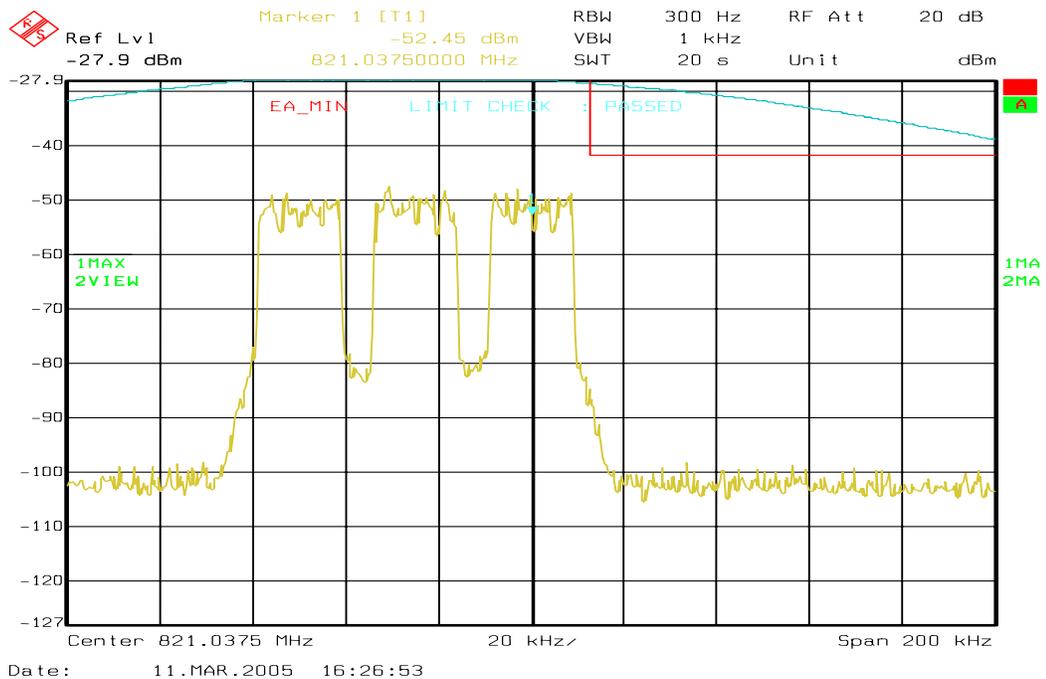
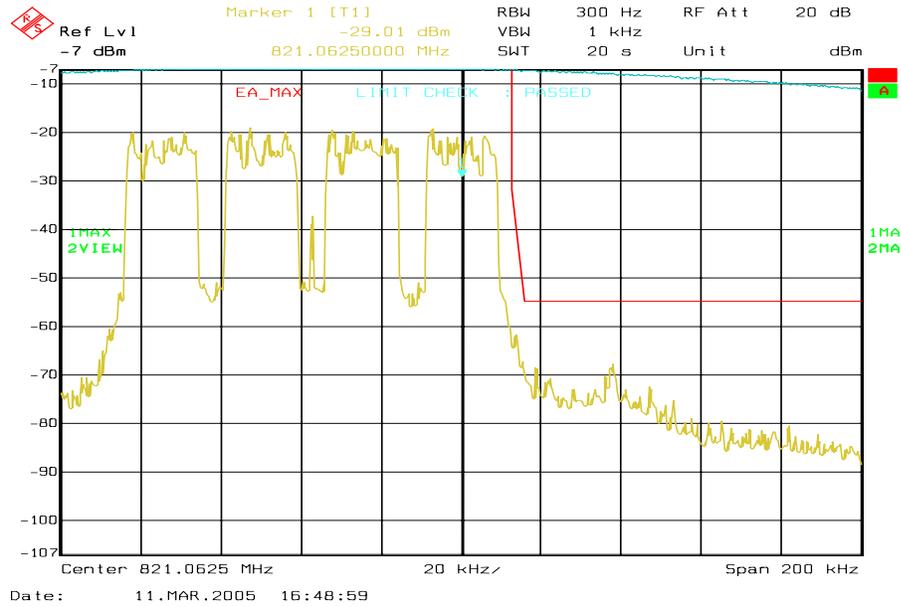
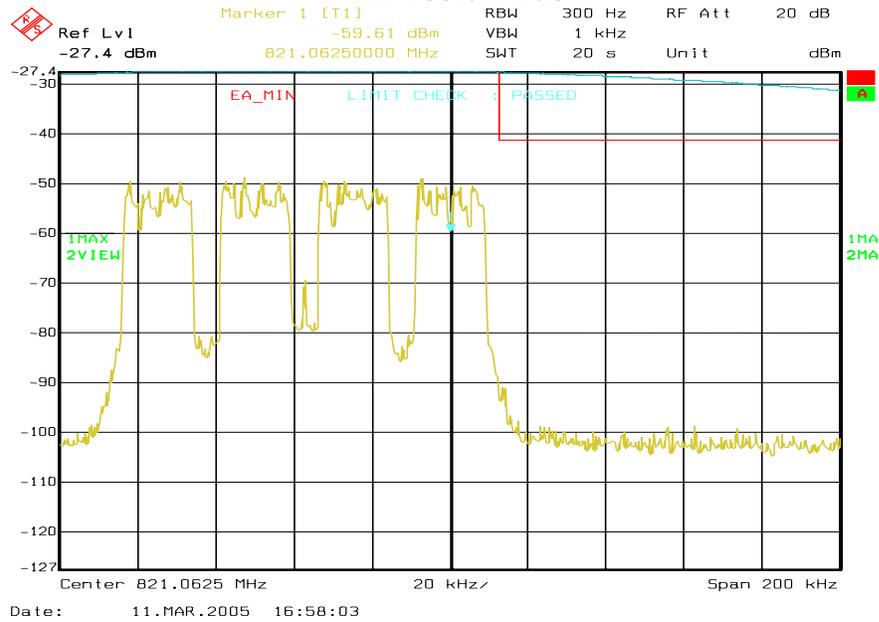


Figure 6a-47 . WiDEN75 800 MHz Band, QAM64, Minimum Power, EA Emission Mask

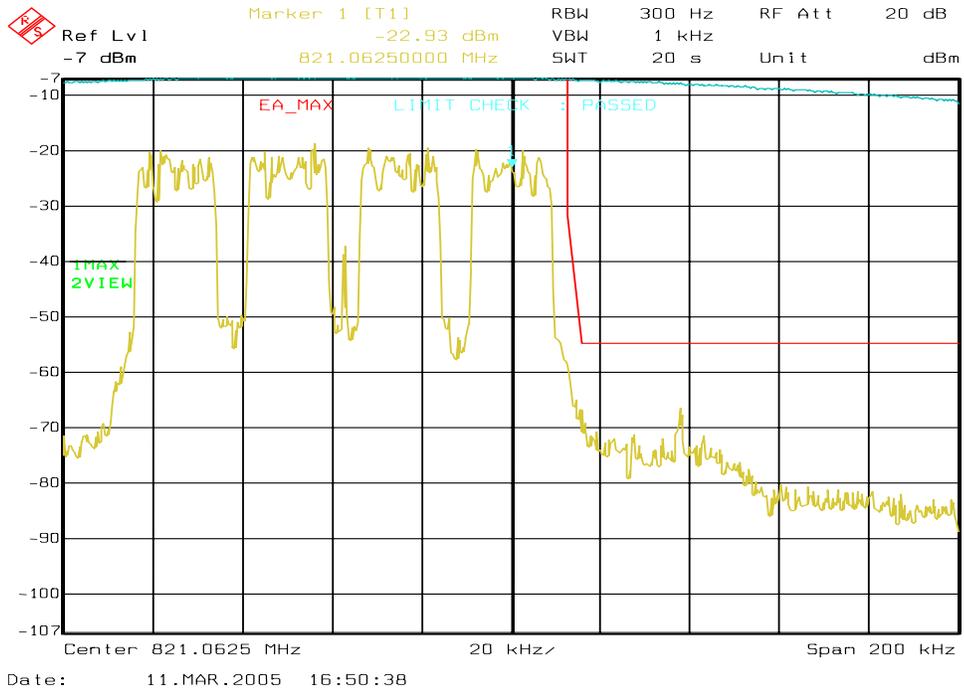
### 6a.2.7 Emission Designator 93K3D7D - WiDEN100 800 MHz Band



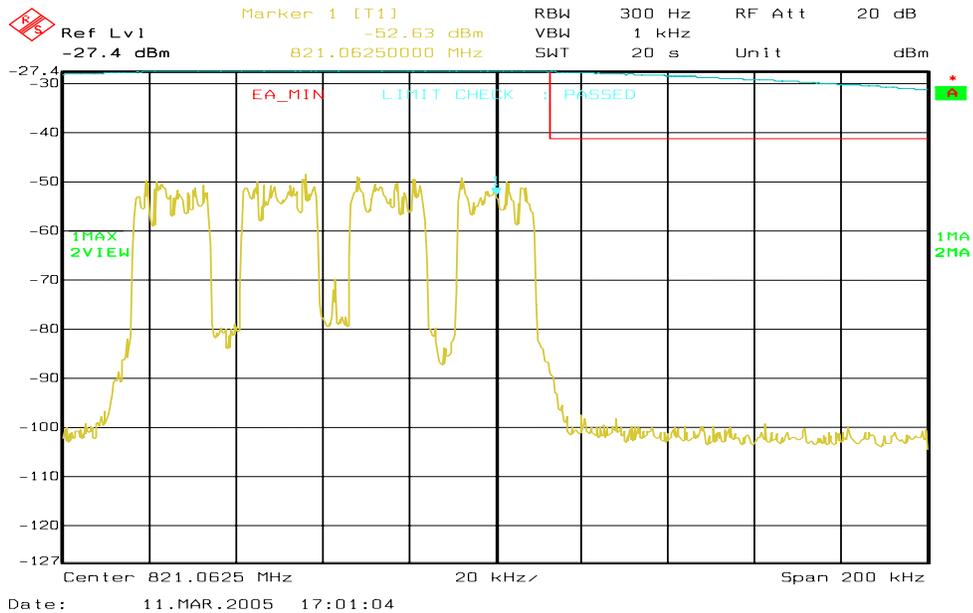
**Figure 6a-48 . WiDEN100 800 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



**Figure 6a-49 . WiDEN100 800 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask**



**Figure 6a-50 . WiDEN100 800 MHz Band, QAM16, Maximum Power, EA Emission Mask**



**Figure 6a-51 . WiDEN100 800 MHz Band, QAM16, Minimum Power, EA Emission Mask**

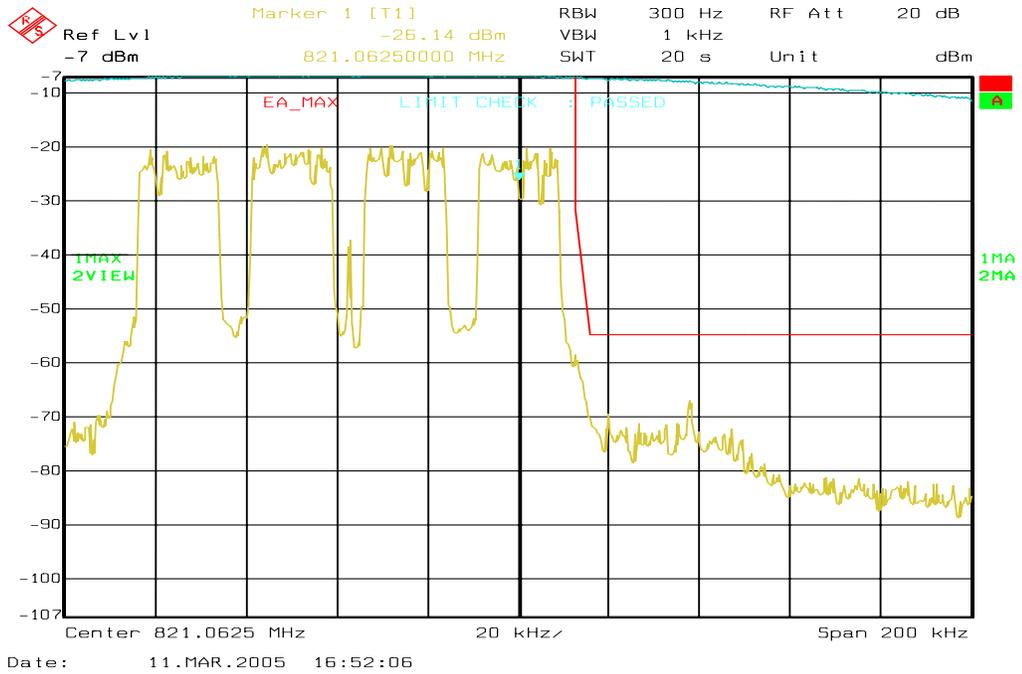


Figure 6a-52 . WiDEN100 800 MHz Band, QAM64, Maximum Power, EA Emission Mask

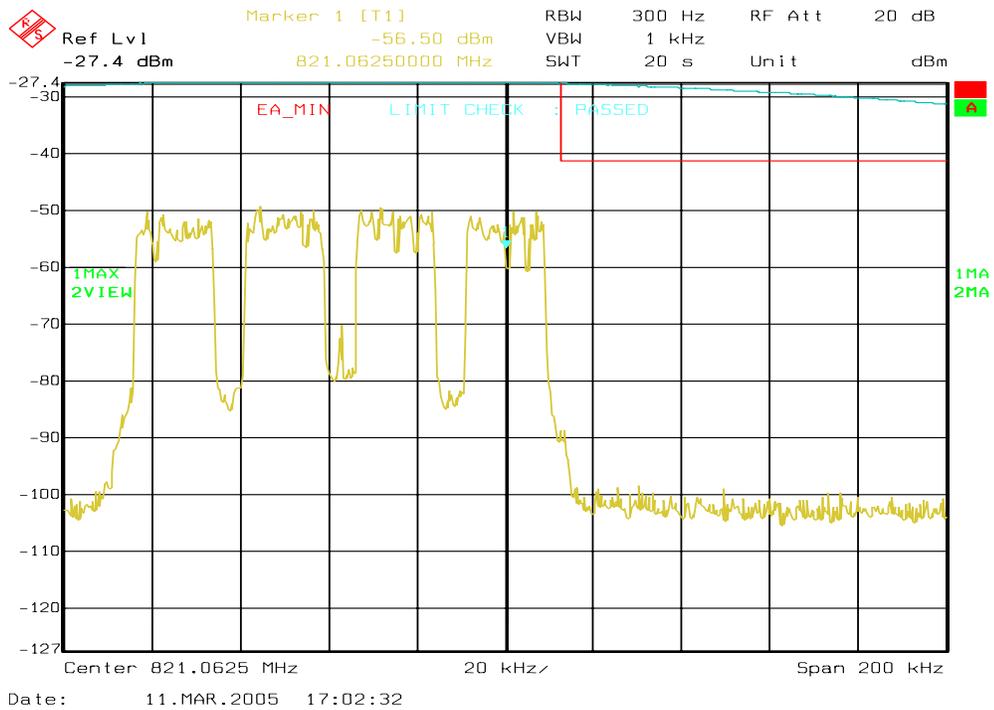


Figure 6a-53 . WiDEN100 800 MHz Band, QAM64, Minimum Power, EA Emission Mask

### 6a.2.8 Emission Designator 93K3D7D - WiDEN50\_Split 800 MHz Band

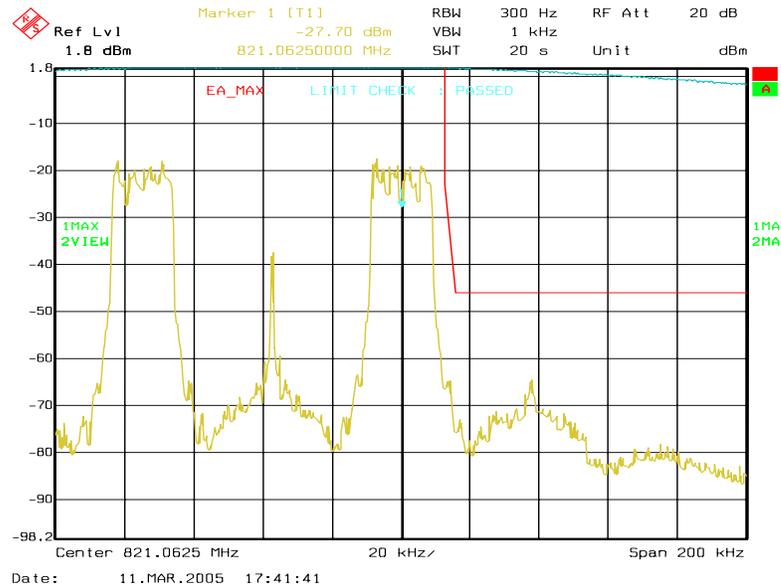


Figure 6a-54 . WiDEN\_50\_Split 800 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask

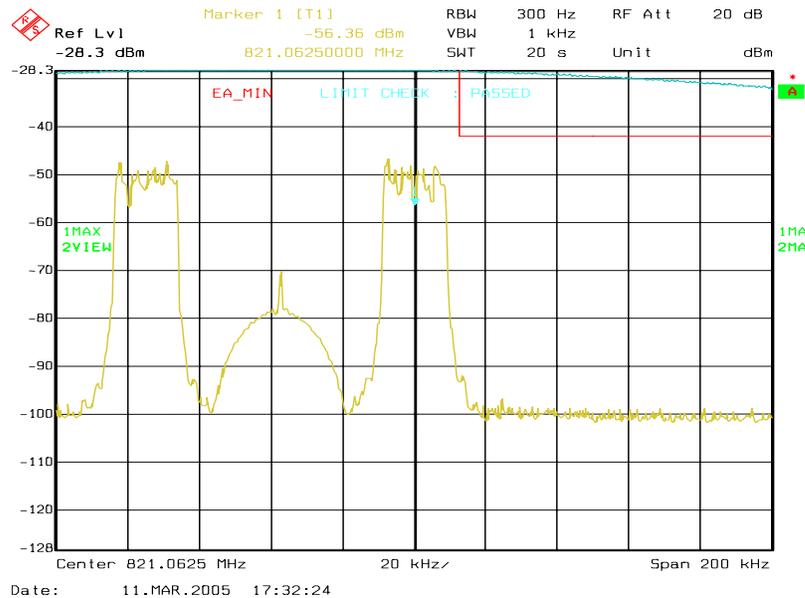
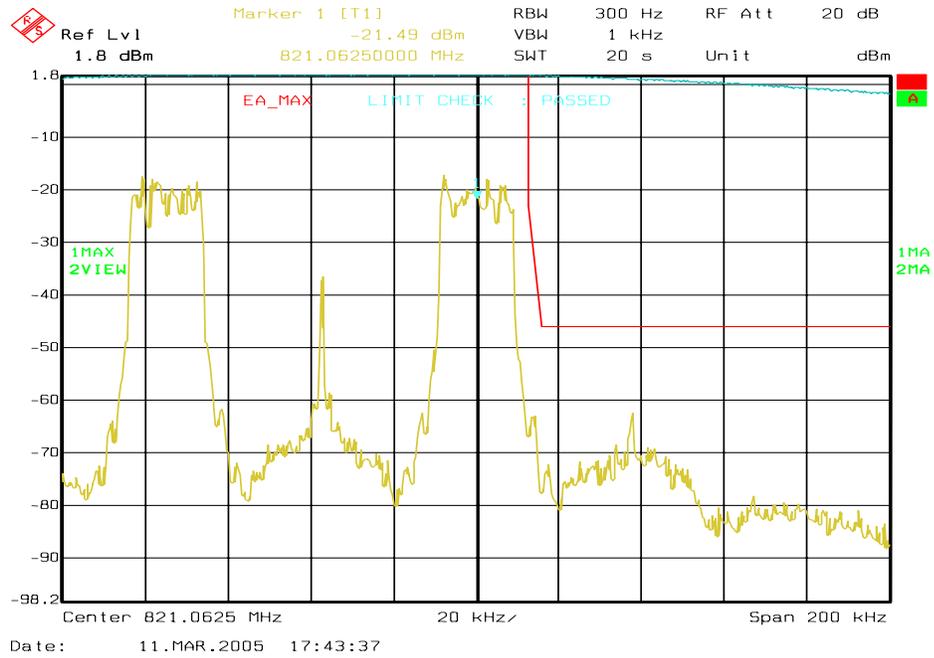
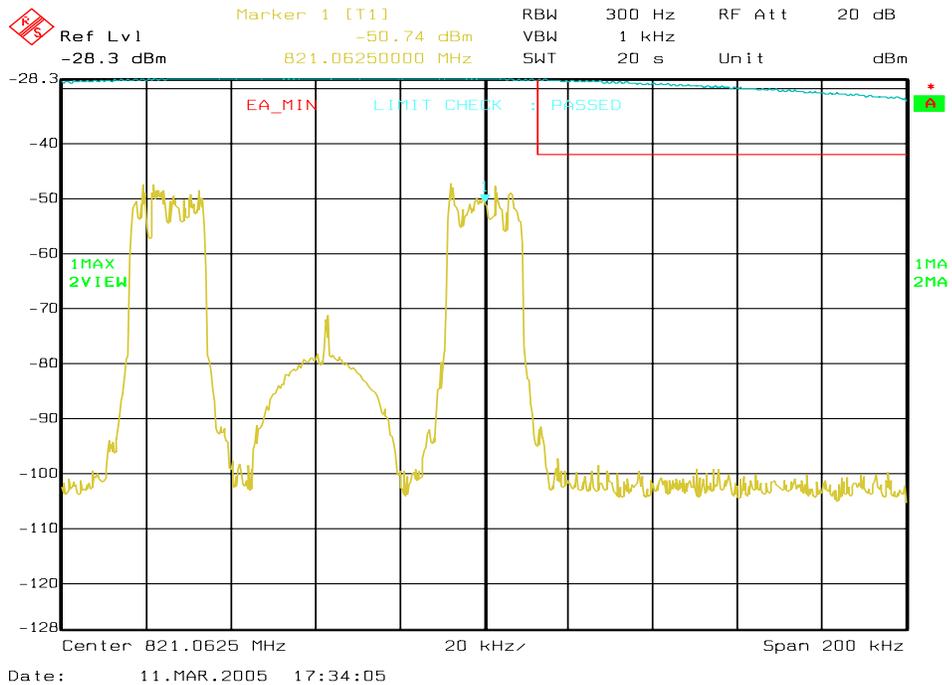


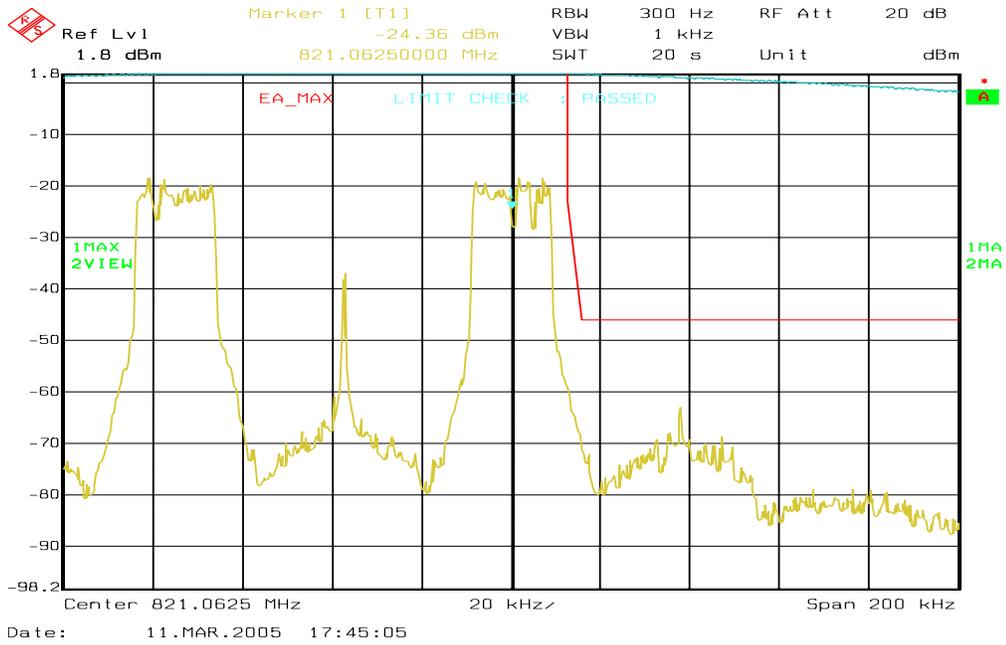
Figure 6a-55 . WiDEN\_50\_Split 800 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask



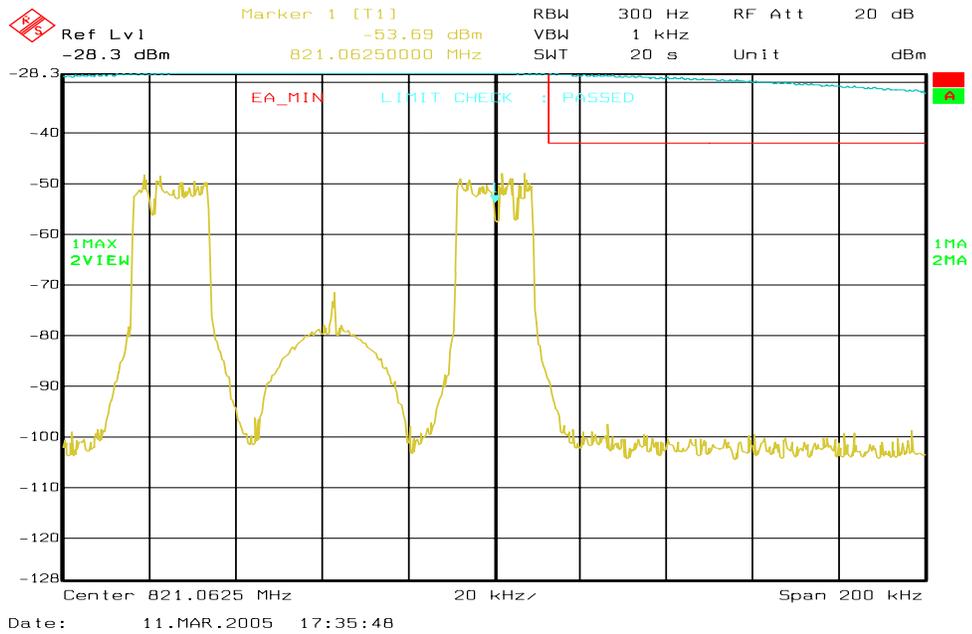
**Figure 6a-56 . WiDEN\_50\_Split 800 MHz Band, QAM16, Maximum Power, EA Emission Mask**



**Figure 6a-57 . WiDEN\_50\_Split 800 MHz Band, QAM16, Minimum Power, EA Emission Mask**

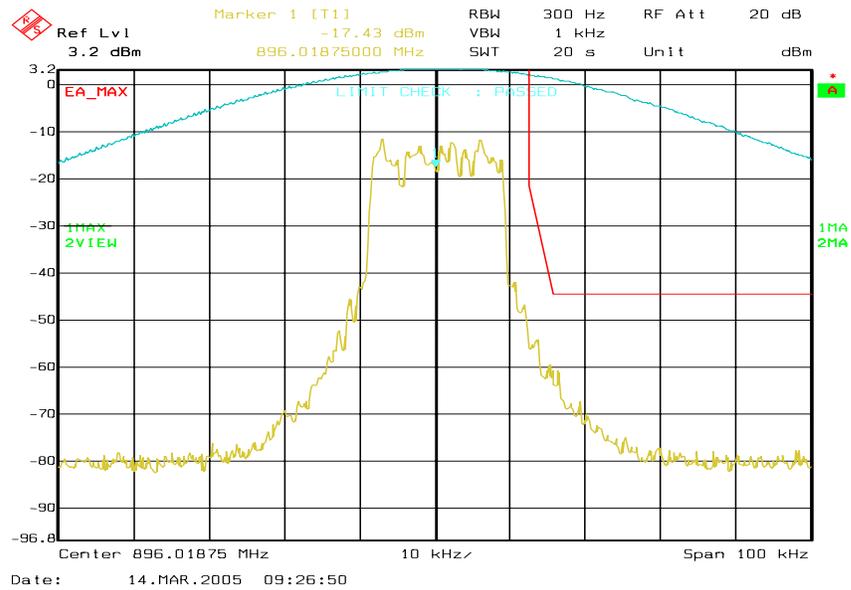


**Figure 6a-58 . WiDEN\_50\_Split 800 MHz Band, QAM64, Maximum Power, EA Emission Mask**

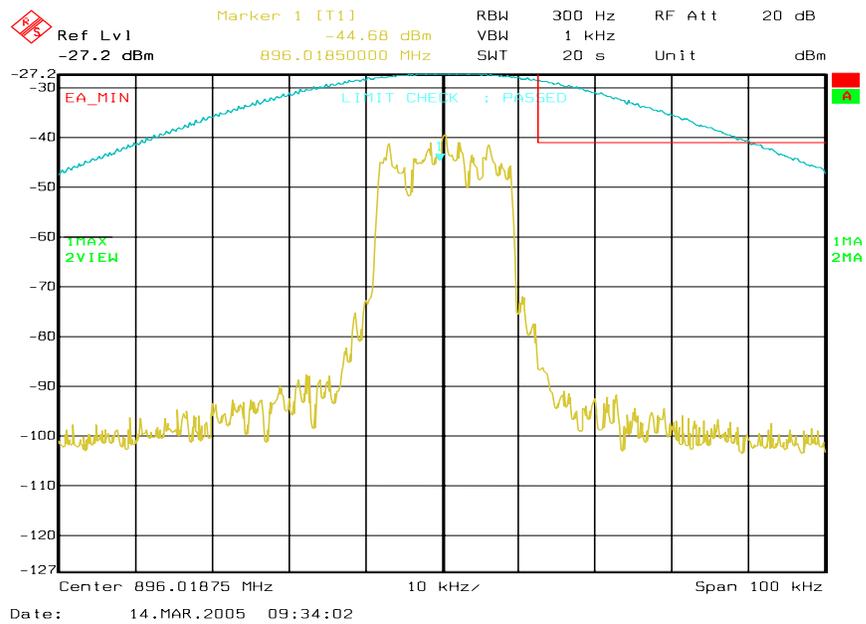


**Figure 6a-59 . WiDEN\_50\_Split 800 MHz Band, QAM64, Minimum Power, EA Emission Mask**

## 6a.2.9 Emission Designator 18K3D7W - WiDEN25 900 MHz Band



**Figure 6a-60 . WiDEN25 900 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



**Figure 6a-61 . WiDEN25 900 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask**

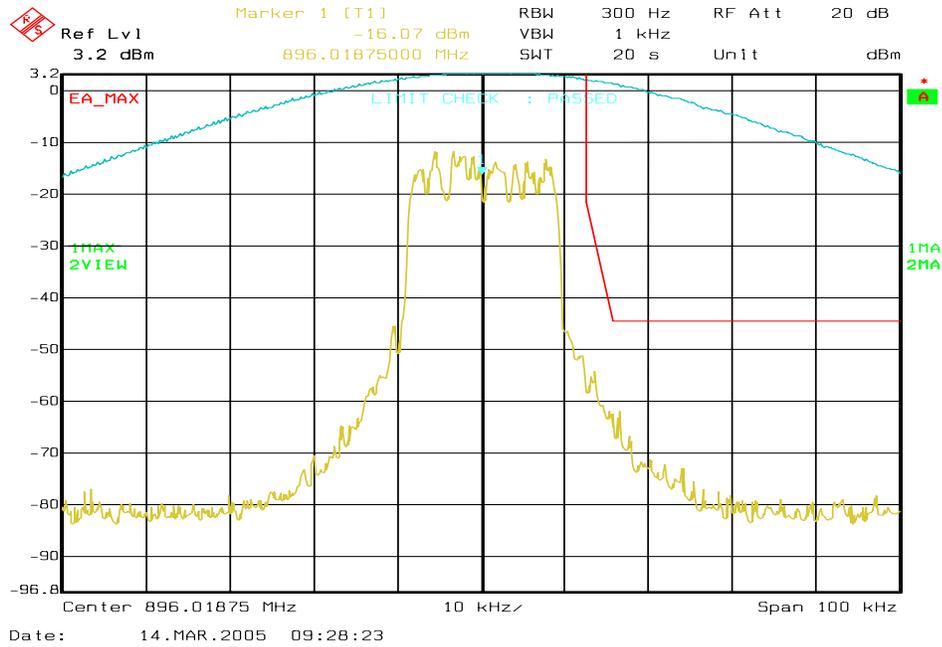


Figure 6a-62 . WiDEN25 900 MHz Band, QAM16, Maximum Power, EA Emission Mask

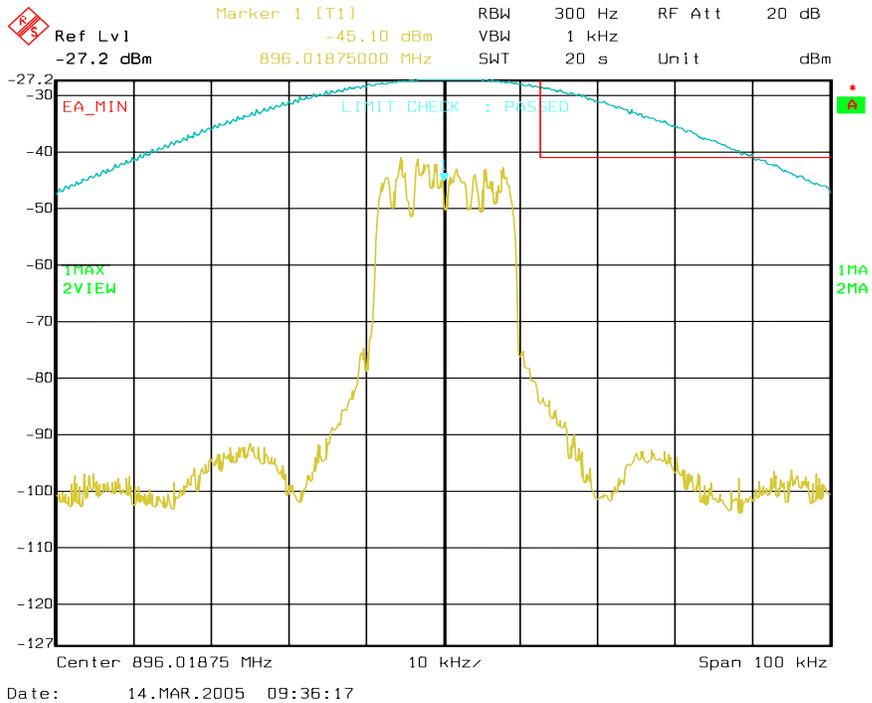


Figure 6a-63 . WiDEN25 900 MHz Band, QAM16, Minimum Power, EA Emission Mask

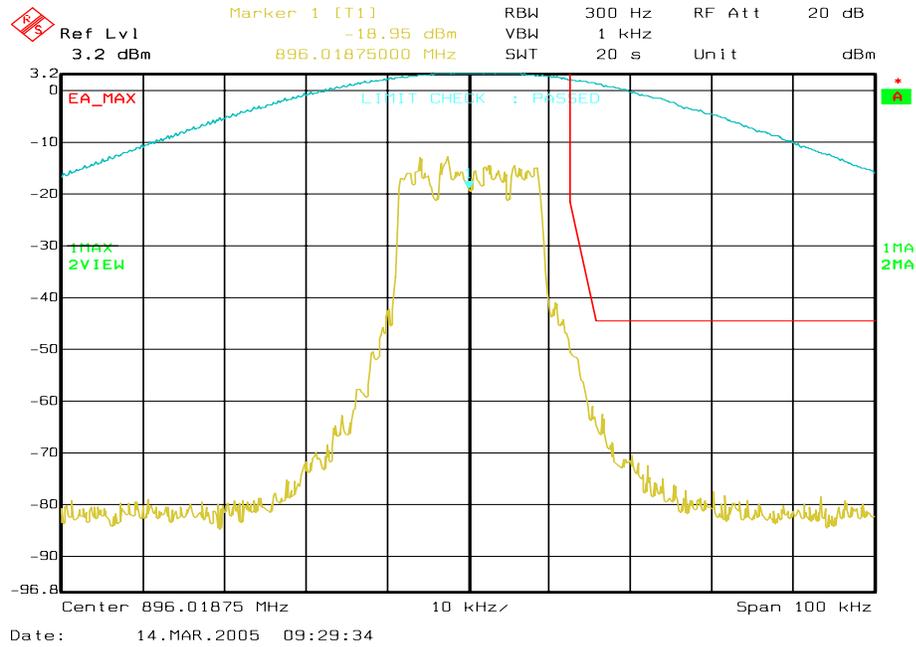


Figure 6a-64 . WiDEN25 900 MHz Band, QAM64, Maximum Power, EA Emission Mask

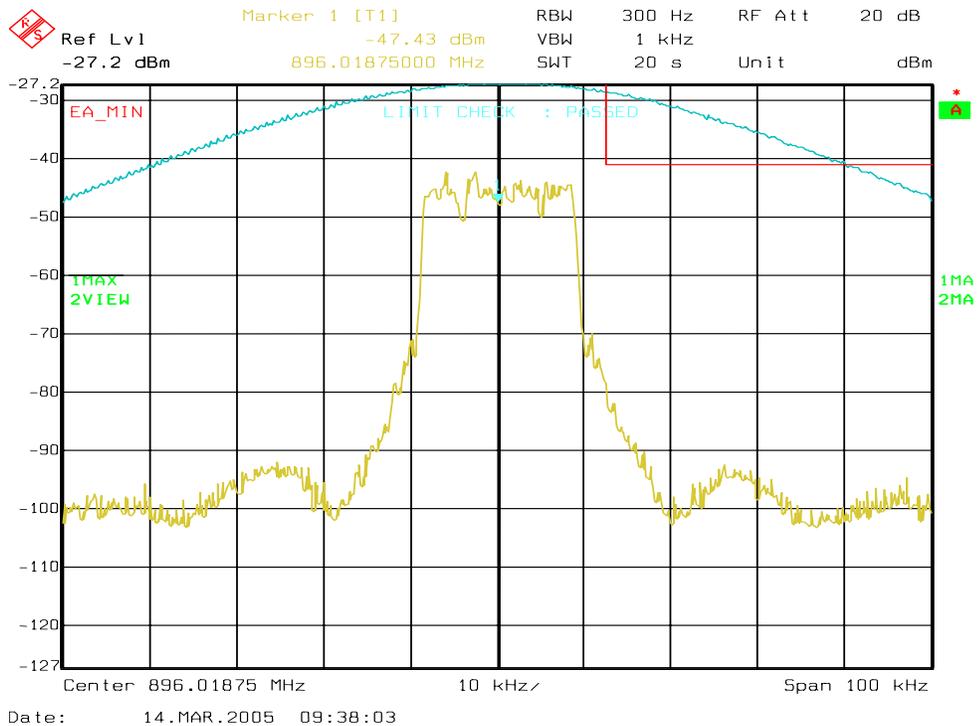
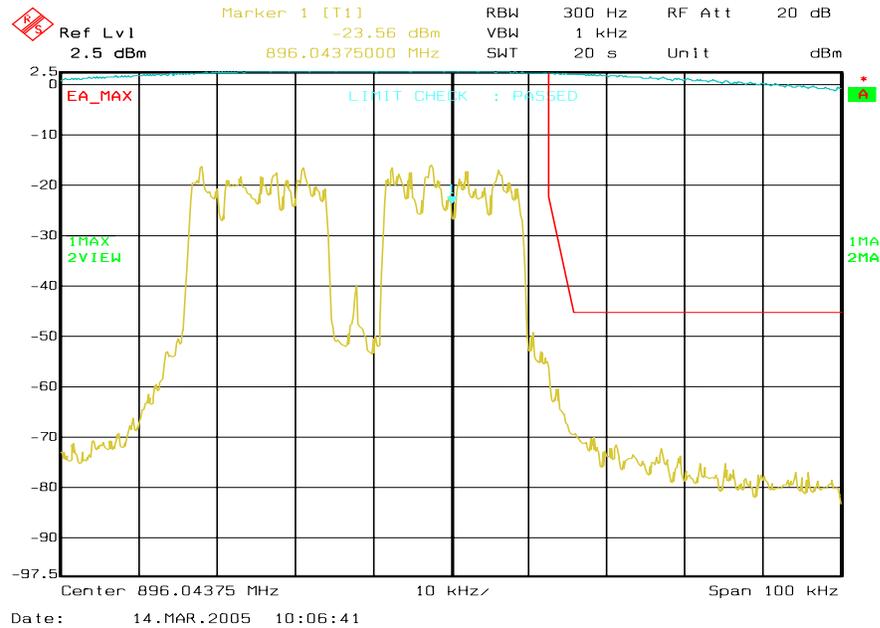
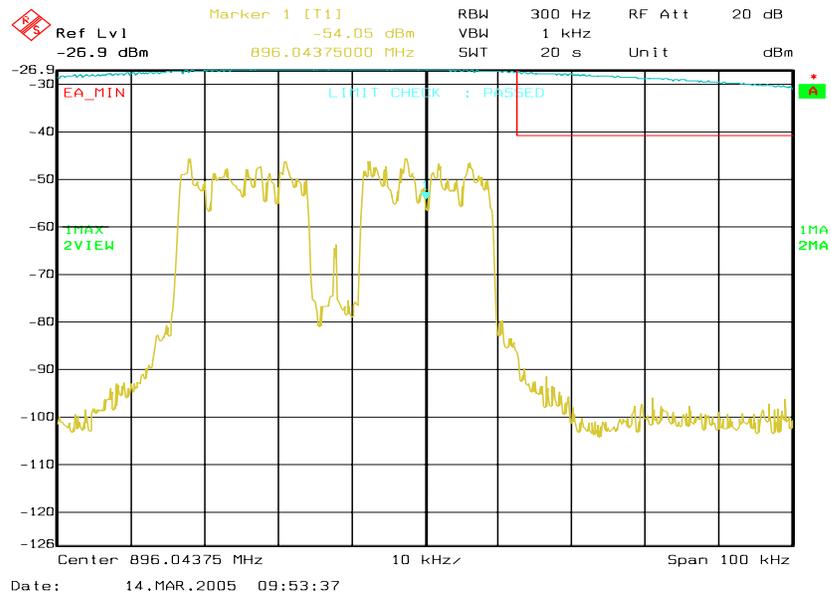


Figure 6a-65 . WiDEN25 900 MHz Band, QAM64, Minimum Power, EA Emission Mask

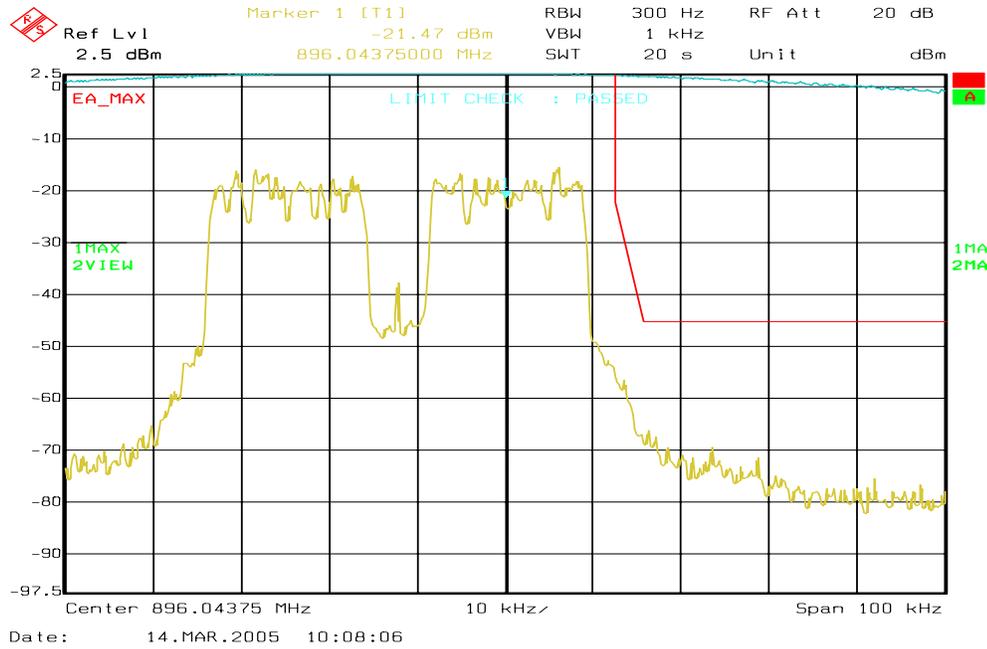
### 6a.2.10 Emission Designator 43K3D7D - WiDEN50 900 MHz Band



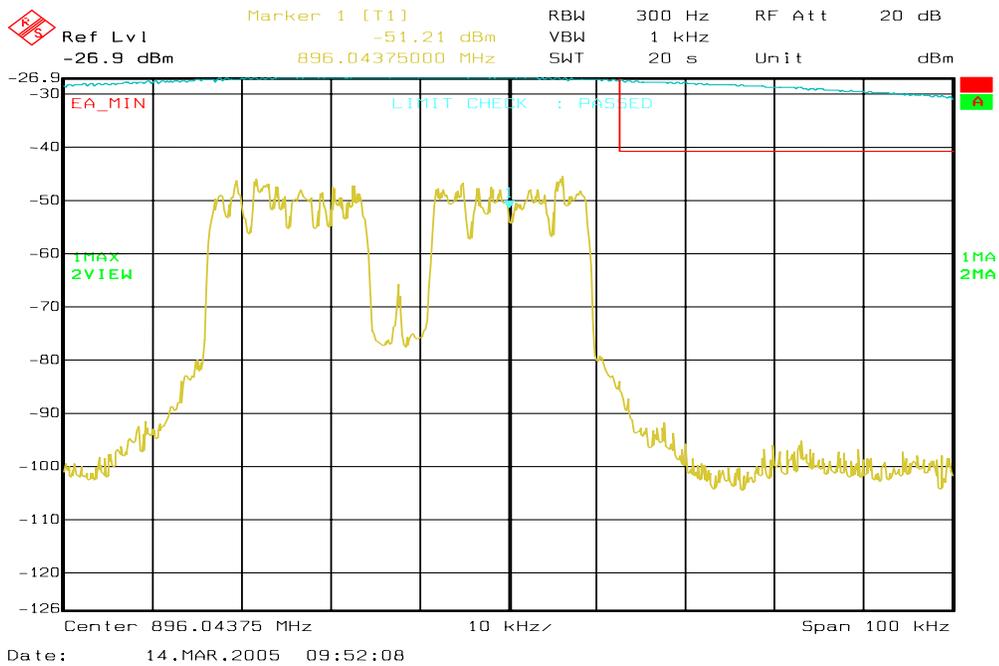
**Figure 6a-66 . WiDEN50 900 MHz Band, Continuous Quad-QPSK, Maximum Power, EA Emission Mask**



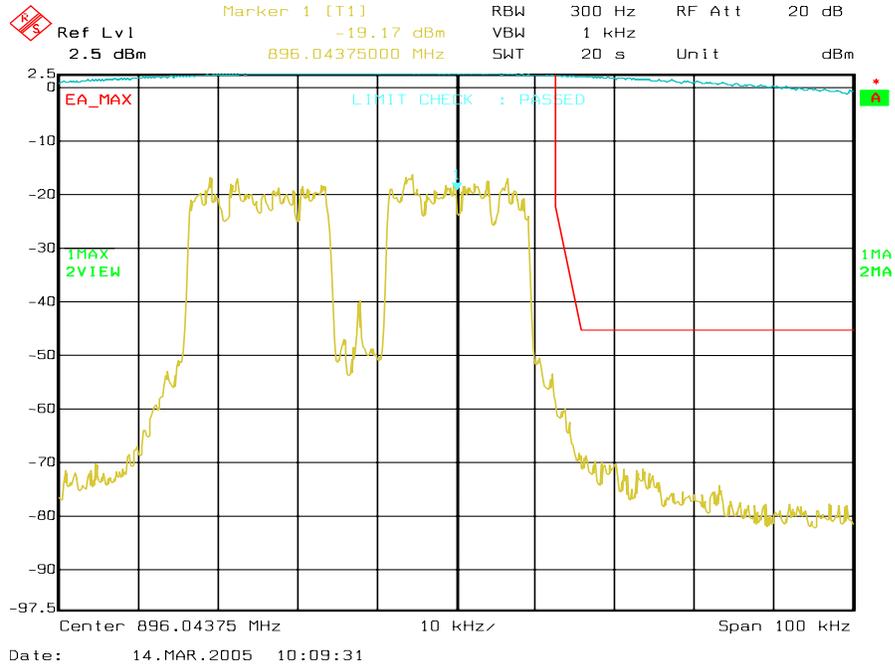
**Figure 6a-67 . WiDEN50 900 MHz Band, Continuous Quad-QPSK, Minimum Power, EA Emission Mask**



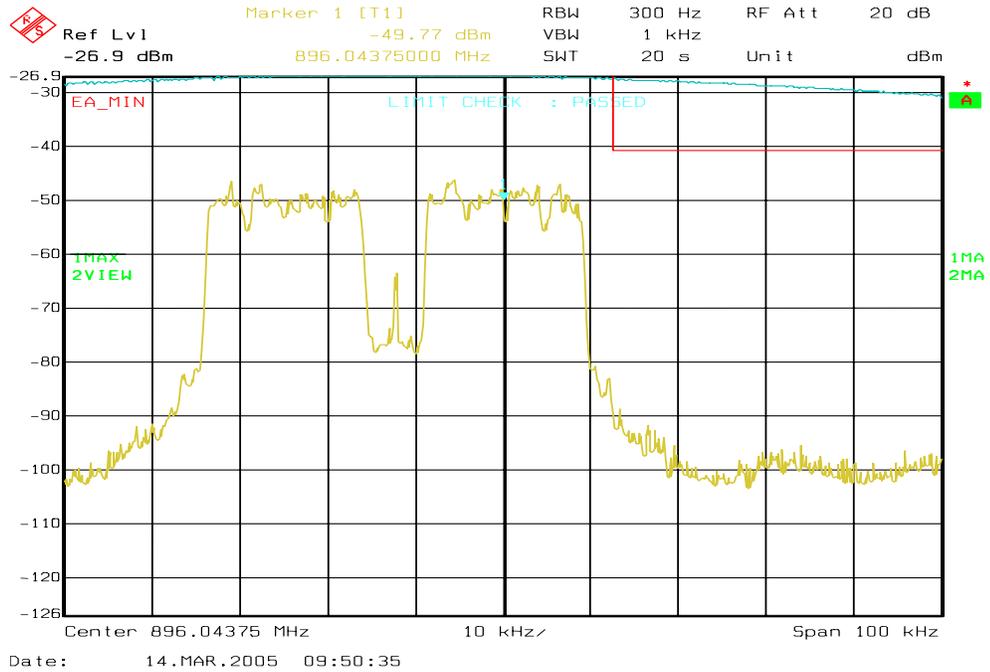
**Figure 6a-68 . WiDEN50 900 MHz Band, Continuous QAM16, Maximum Power, EA Emission Mask**



**Figure 6a-69 . WiDEN50 900 MHz Band, Continuous QAM16, Minimum Power, EA Emission Mask**

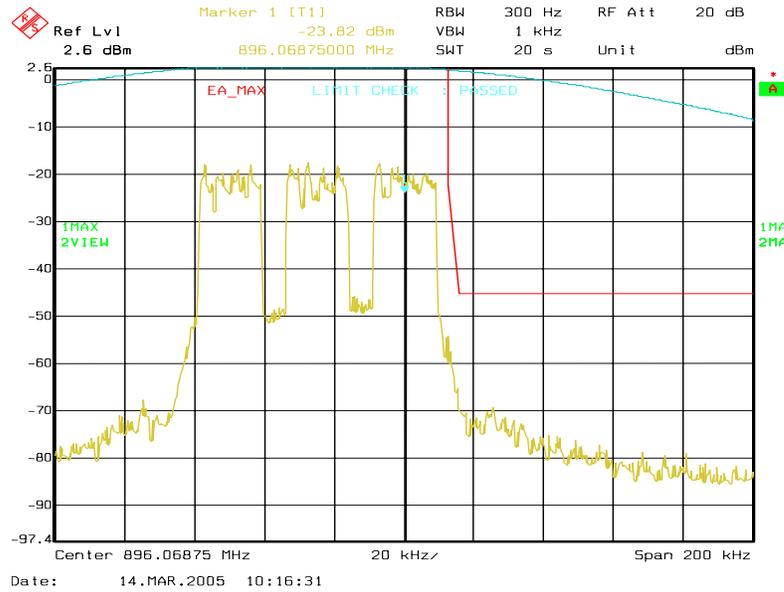


**Figure 6a-70. WiDEN50 900 MHz Band, Continuous QAM64, Maximum Power, EA Emission Mask**

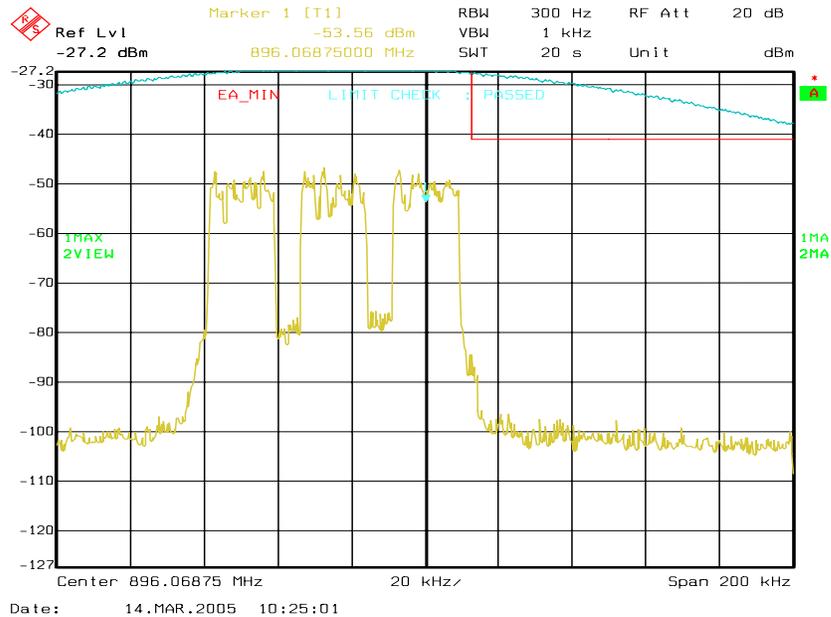


**Figure 6a-71 . WiDEN50 900 MHz Band, Continuous QAM64, Minimum Power, EA Emission Mask**

## 6a.2.11 Emission Designator 68K3D7D - WiDEN75 900 MHz Band



**Figure 6a-72 . WiDEN75 900 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



**Figure 6a-73 . WiDEN75 900 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask**

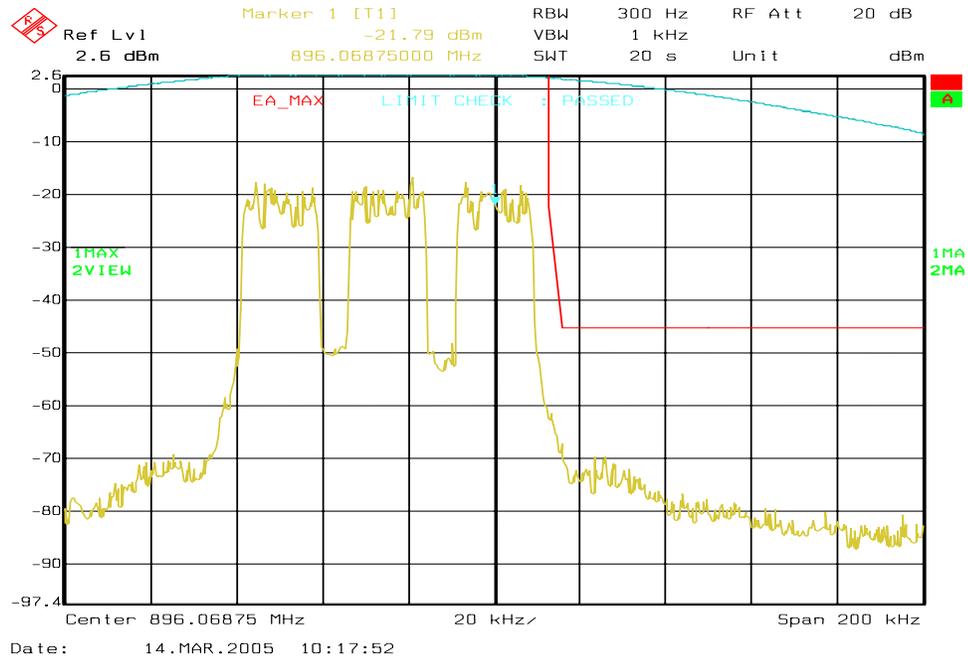


Figure 6a-74 . WiDEN75 900 MHz Band, QAM16, Maximum Power, EA Emission Mask

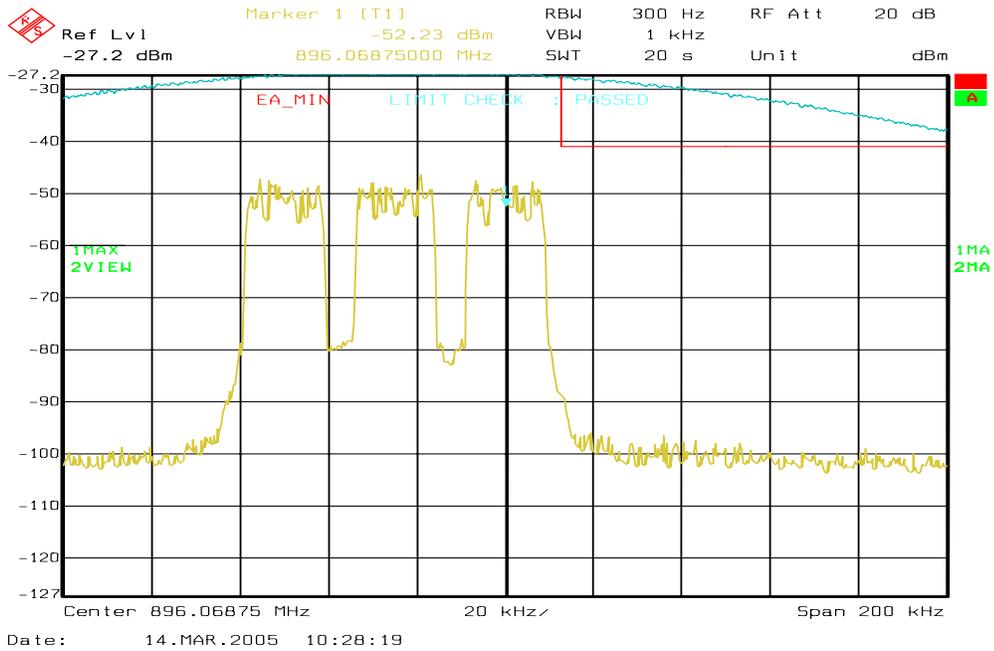


Figure 6a-75 . WiDEN75 900 MHz Band, QAM16, Minimum Power, EA Emission Mask

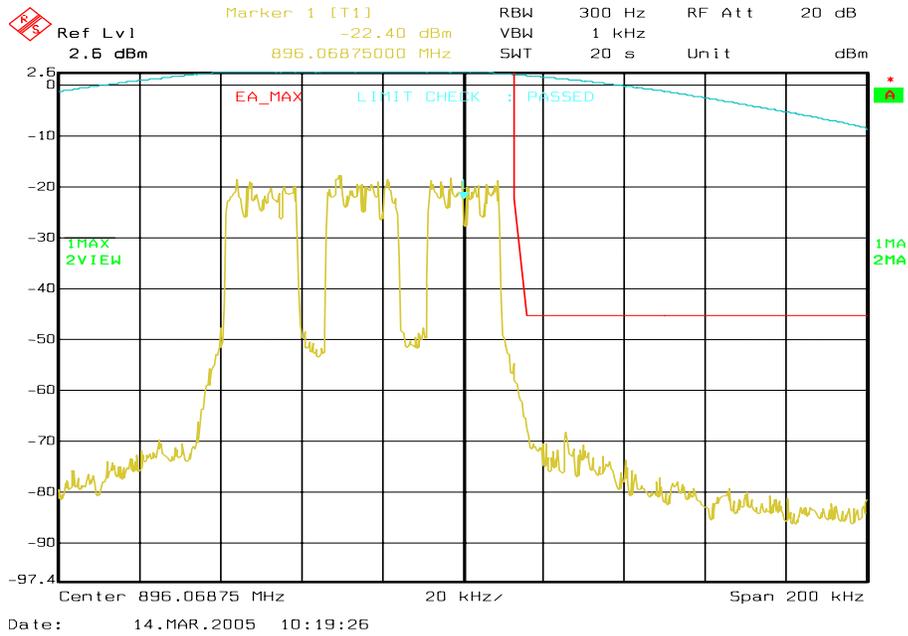


Figure 6a-76 . WiDEN75 900 MHz Band, QAM64, Maximum Power, EA Emission Mask

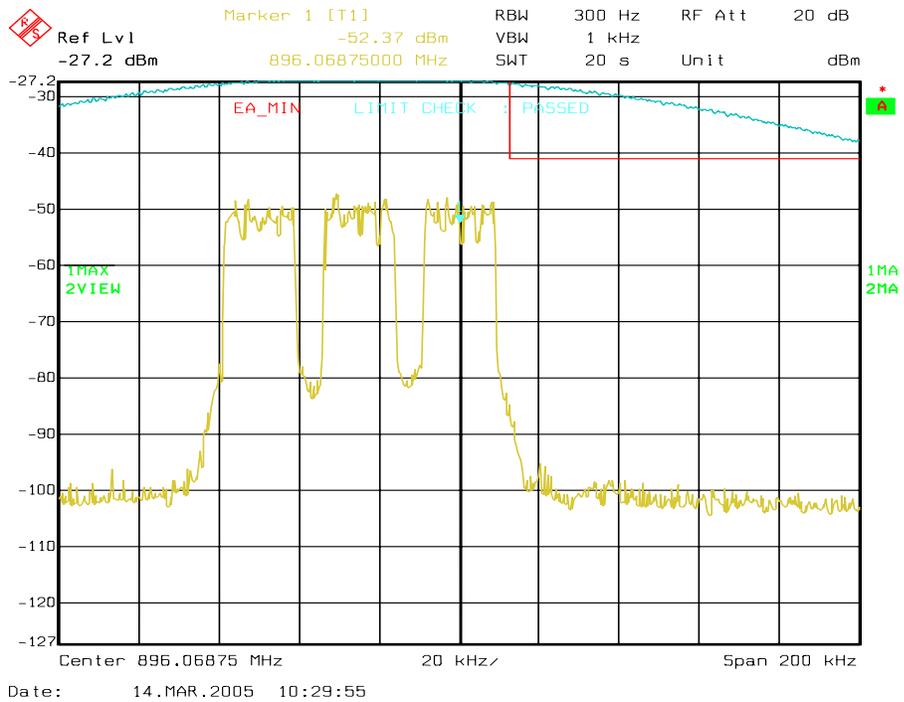
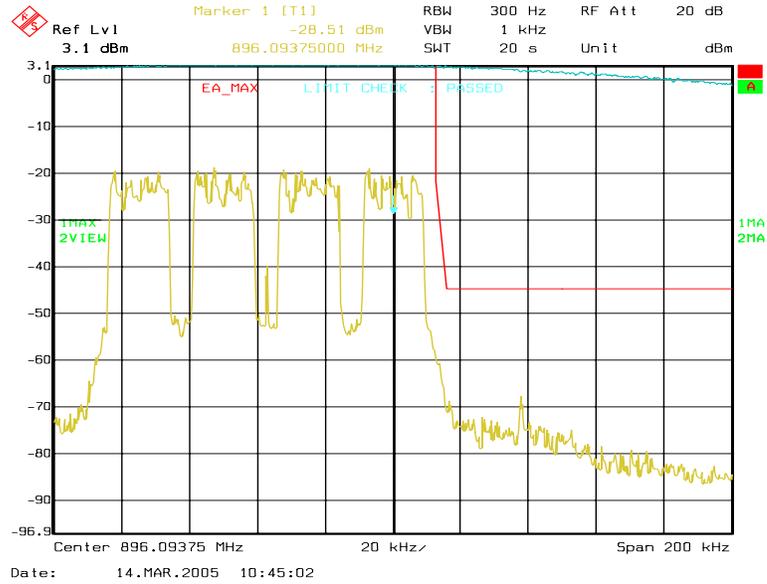
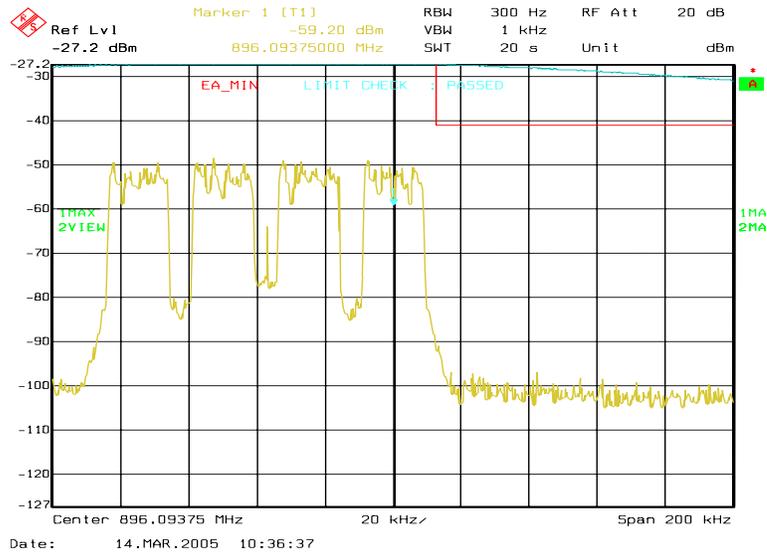


Figure 6a-77 . WiDEN75 900 MHz Band, QAM64, Minimum Power, EA Emission Mask

## 6a.2.12 Emission Designator 93K3D7D - WiDEN100 900 MHz Band



**Figure 6a-78 . WiDEN100 900 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



**Figure 6a-79 . WiDEN100 900 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask**

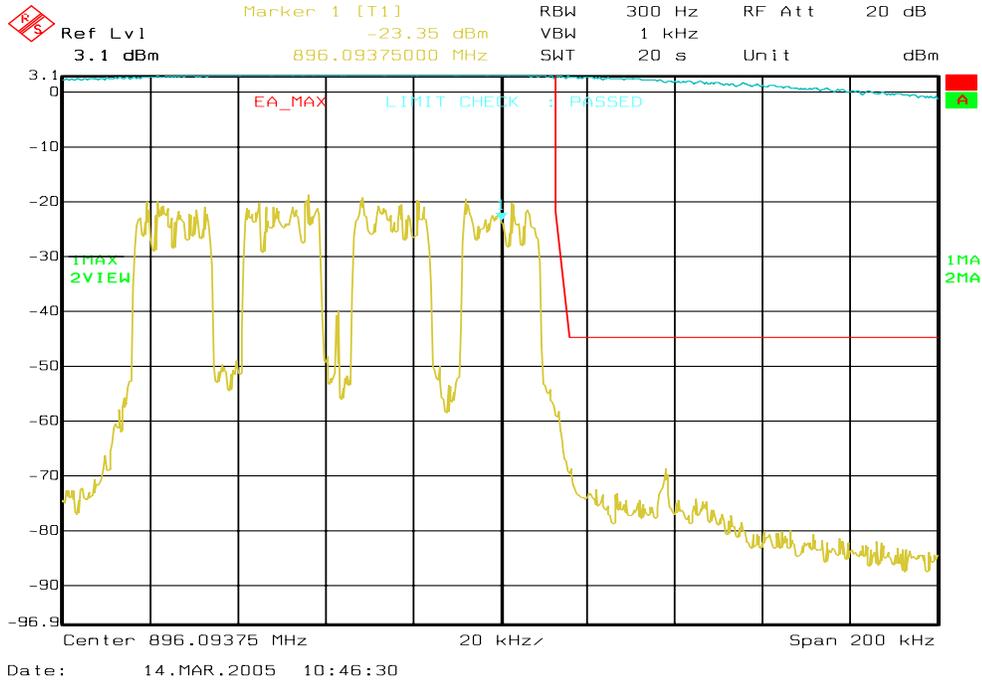


Figure 6a-80 . WiDEN100 900 MHz Band, QAM16, Maximum Power, EA Emission Mask

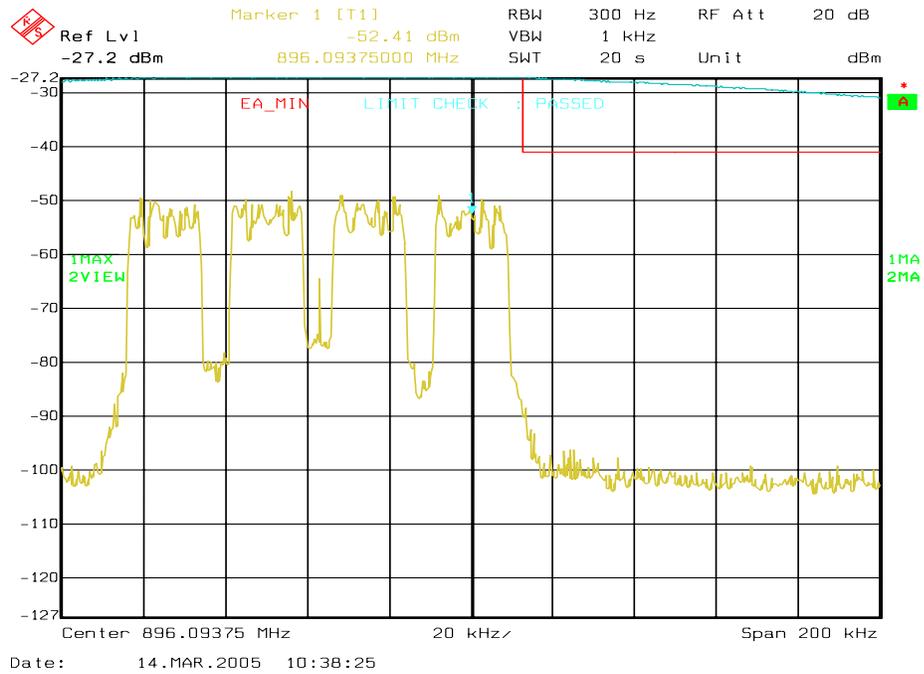
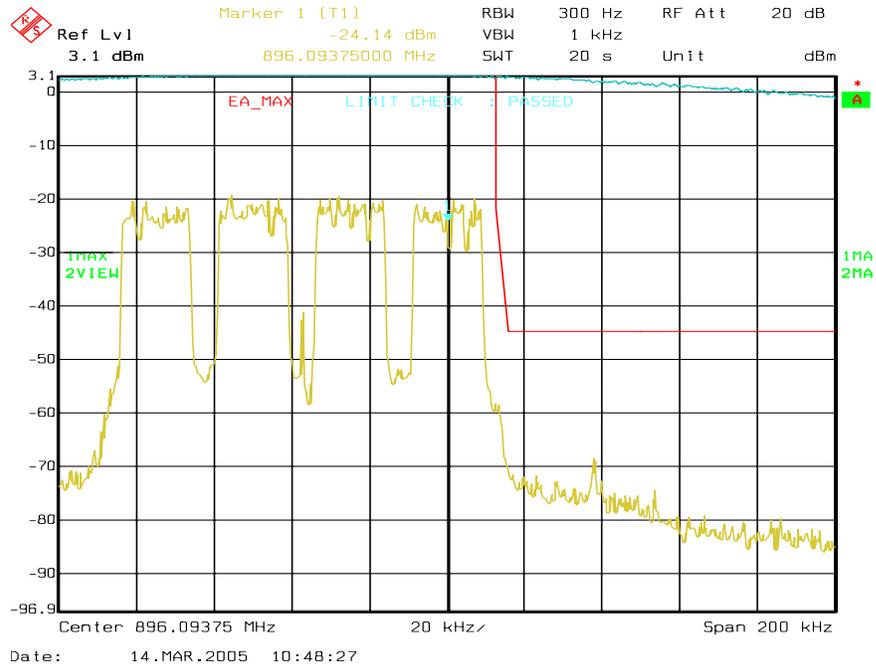
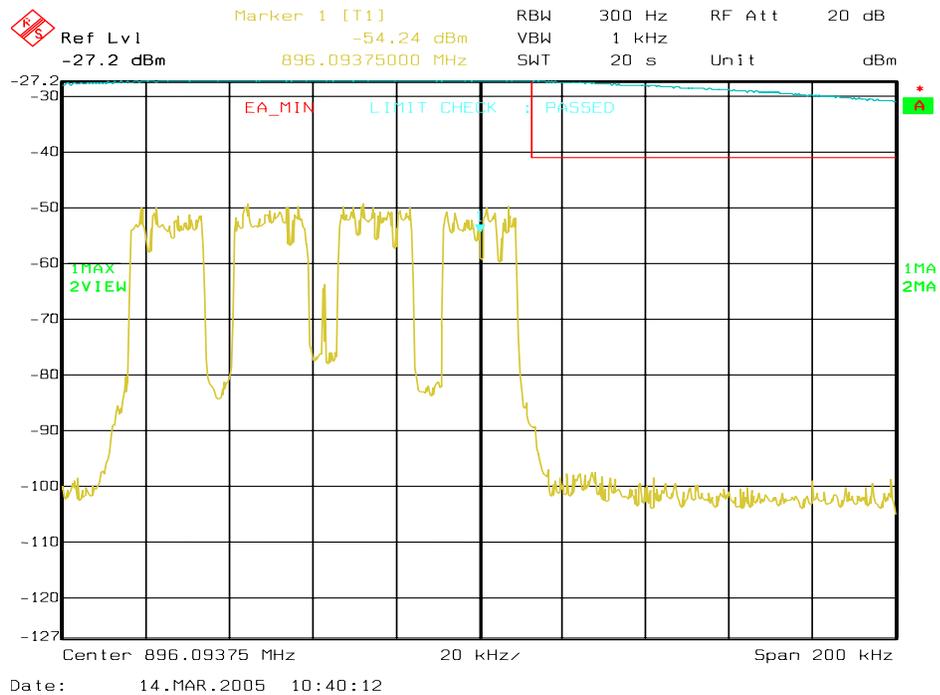


Figure 6a-81 . WiDEN100 900 MHz Band, QAM16, Minimum Power, EA Emission Mask

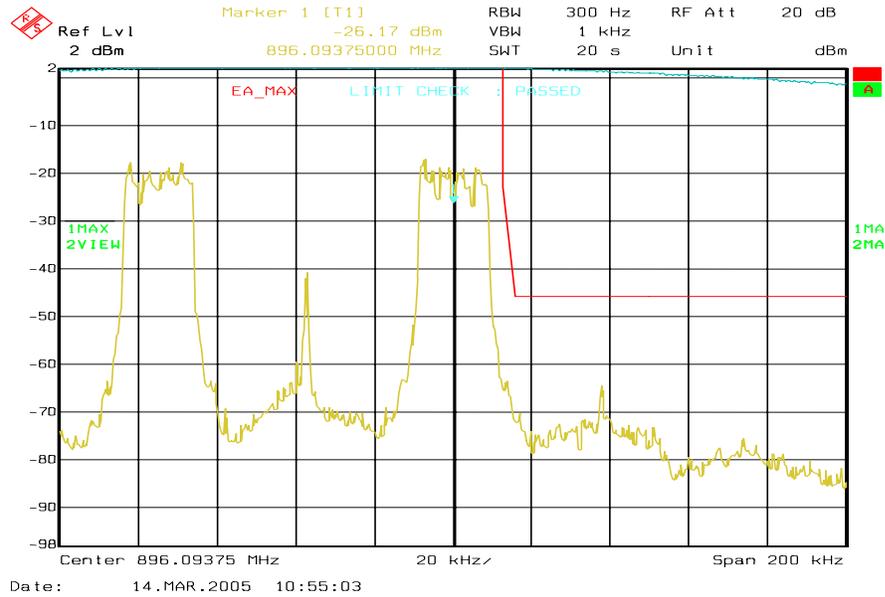


**Figure 6a-82 . WiDEN100 900 MHz Band, QAM64, Maximum Power, EA Emission Mask**

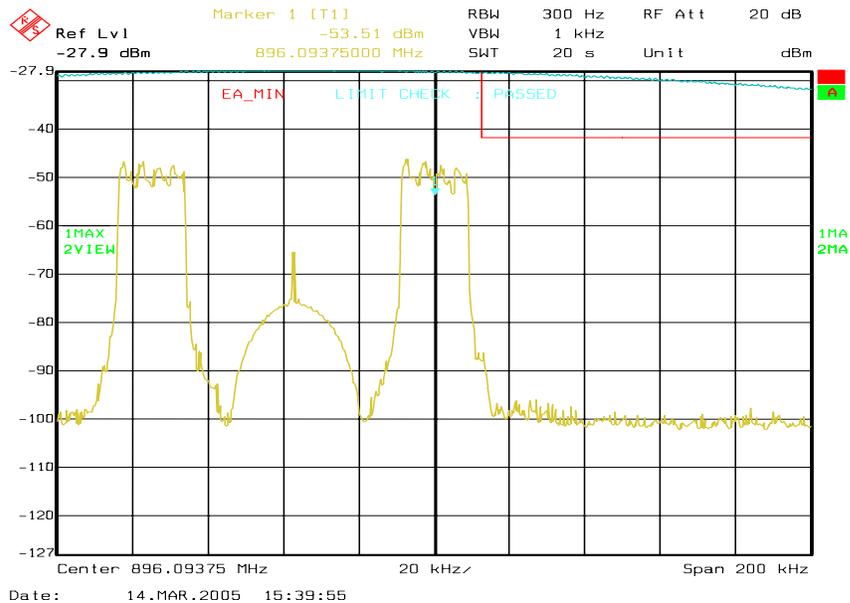


**Figure 6a-83 . WiDEN100 900 MHz Band, QAM64, Minimum Power, EA Emission Mask**

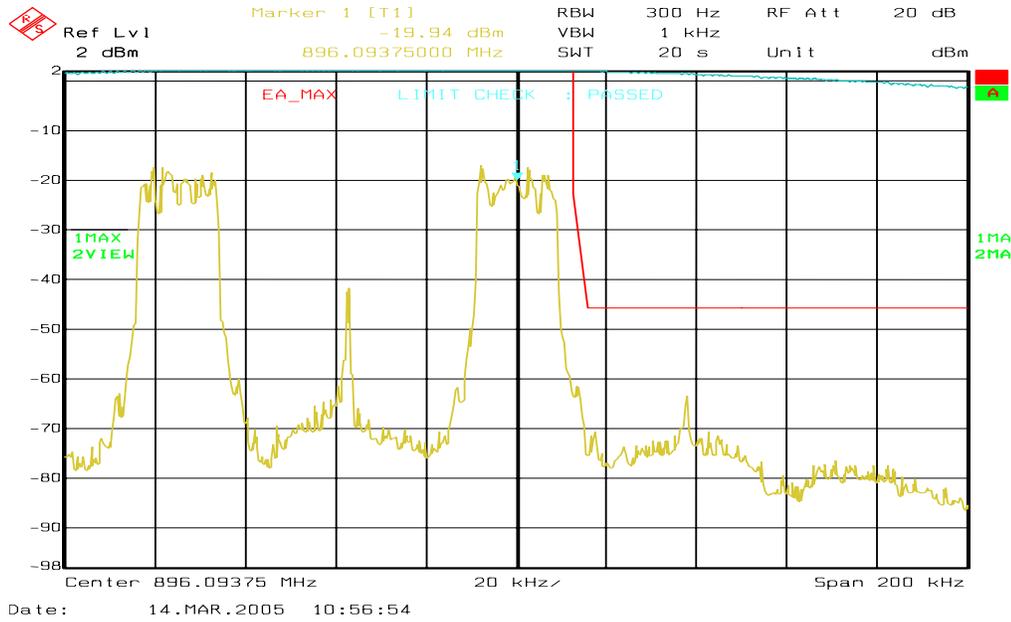
### 6a.2.13 Emission Designator 93K3D7D - WiDEN50\_Split 900 MHz Band



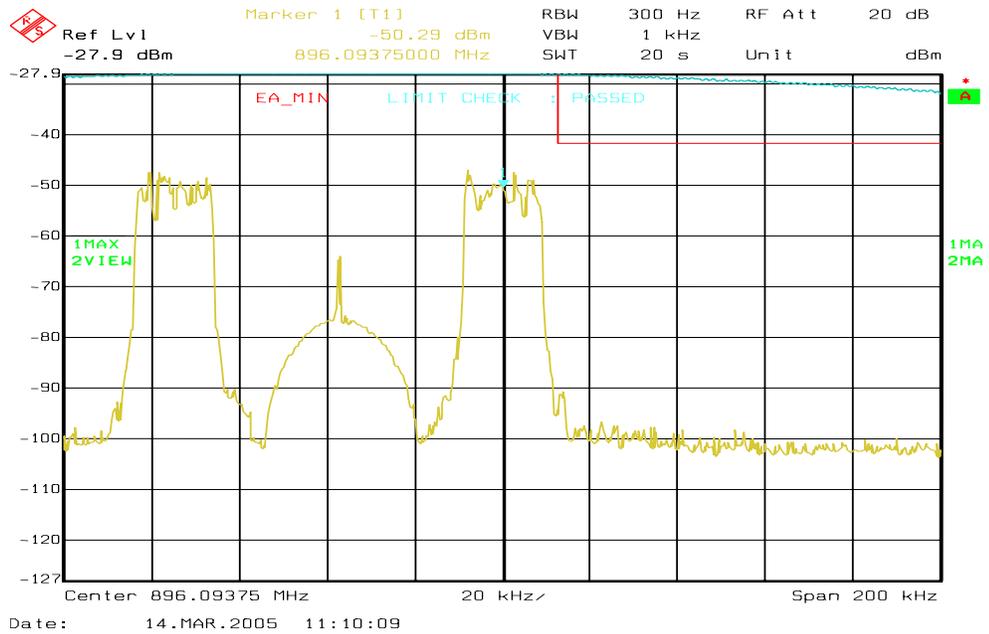
**Figure 6a-84 . WiDEN\_50\_Split 900 MHz Band, Quad-QPSK, Maximum Power, EA Emission Mask**



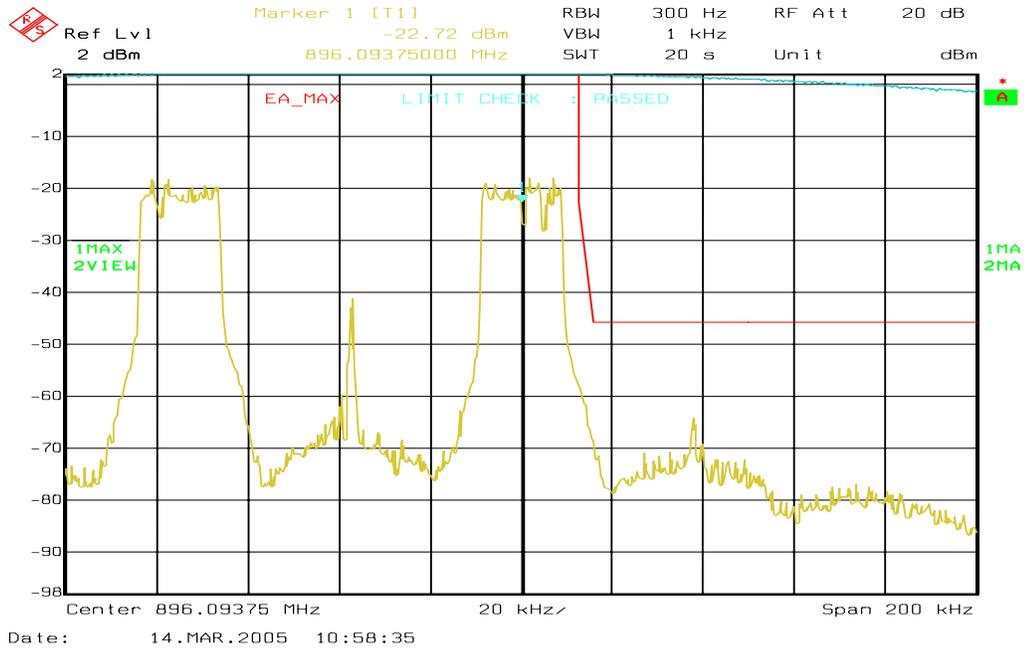
**Figure 6a-85 . WiDEN\_50\_Split 900 MHz Band, Quad-QPSK, Minimum Power, EA Emission Mask**



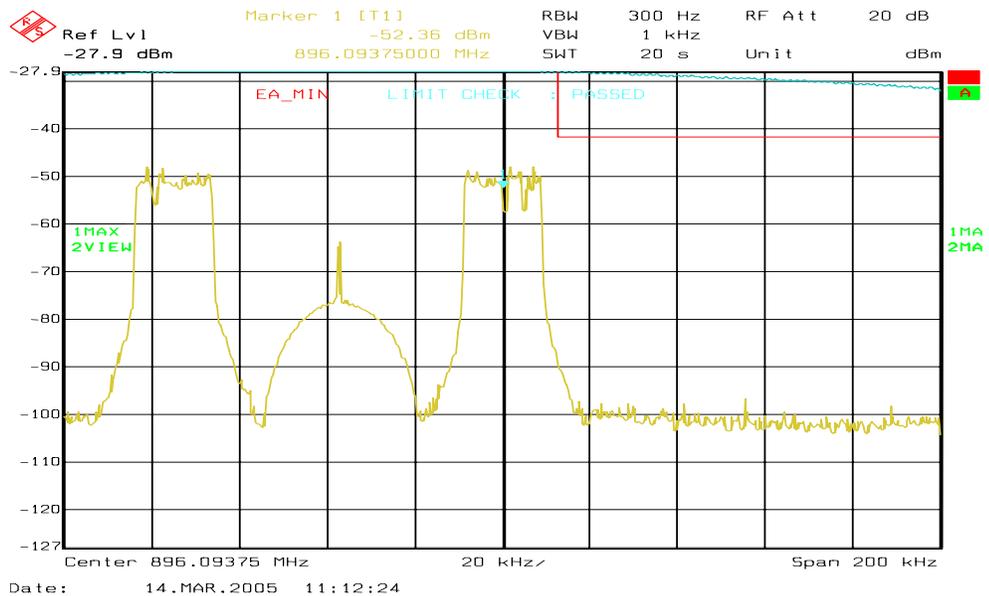
**Figure 6a-86 . WiDEN\_50\_Split 900 MHz Band, QAM16, Maximum Power, EA Emission Mask**



**Figure 6a-87 . WiDEN\_50\_Split 900 MHz Band, QAM16, Minimum Power, EA Emission Mask**



**Figure 6a-88 . WiDEN\_50\_Split 900 MHz Band, QAM64, Maximum Power, EA Emission Mask**



**Figure 6a-89 . WiDEN\_50\_Split 900 MHz Band, QAM64, Minimum Power, EA Emission Mask**